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AVIATION

The Oldest American Aeronautical Magazine

Quantity Production Methods FOR AIRCRAFT

THE *Used Plane* PROBLEM

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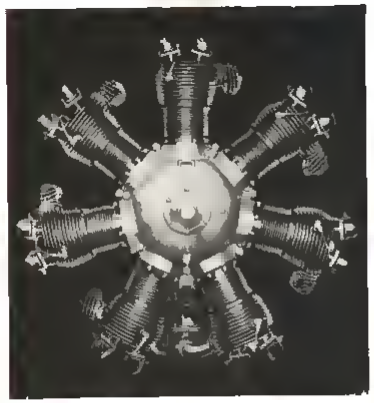

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The New Mobiloil Aero "W"

A special "Double-Range" oil for winter flying

Here is a new lubricant specially refined to meet the exacting demands of cold weather operation in modern aircraft engines. No more preheating . . . no more watching the clock while you're warming up . . . the New Mobiloil Aero "W" gives instant distribution the moment of contact.

Mobiloil engineers have perfected this new oil, combining *all* the qualities necessary for correct winter lubrication of aircraft engines, as Mobiloil Arctic does for winter lubrication of motor cars. In the New Mobiloil Aero "W" we offer the final result of extensive chemical and physical research in our own special cold weather laboratories, and exhaustive tests by leading engine builders under actual service conditions.

"Double-Range" important in winter flying

Advanced manufacturing processes applied to a specially selected type of crude oil are responsible for the distinctive "Double-Range" feature of this New Mobiloil Aero "W". Perfect fluidity in coldest weather assures immediate circulation at low starting torque; while, as a result of special processing, Mobiloil Aero "W" yet retains its full, rich lubricating body under extreme heat and load conditions of high-speed operation sustained over long periods.

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VACUUM OIL COMPANY
Makers of high-quality lubricants for all types of machinery

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AERO OILS

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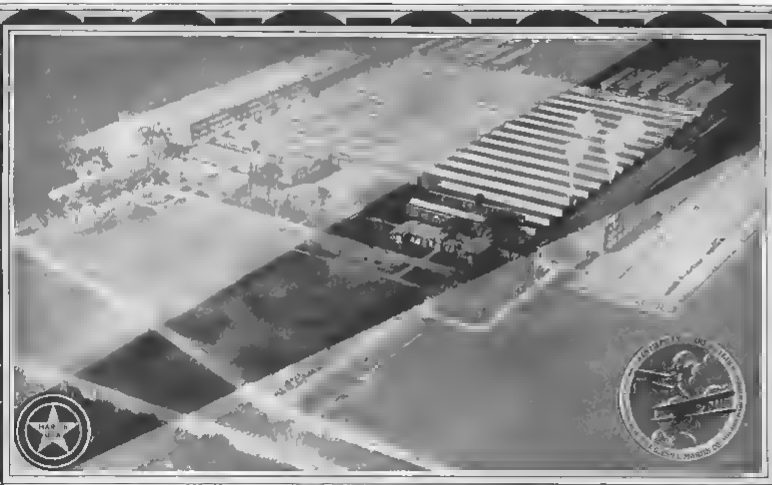

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-TP- Oils are new—the latest development in scientific lubrication. They have been tested and approved by leading manufacturers of airplane engines and by many leading pilots. They are straight-run oils, not blended or compounded, produced from pure, paraffine-base crude by a process for which patents are pending.

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A handsome, practical *Pilot's Log Book* sent free on request.

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-TP- Aero Valve Spring Lubricant

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-TP-AERO MOTOR LUBRICATING OIL

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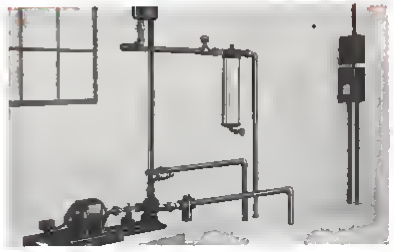
Aviation gasoline dispensed from Bowser Fueling Systems is clean—dry—SAFE!



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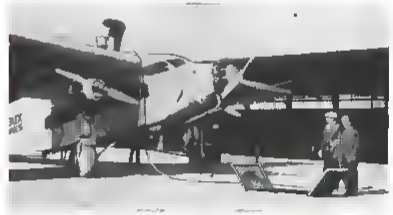

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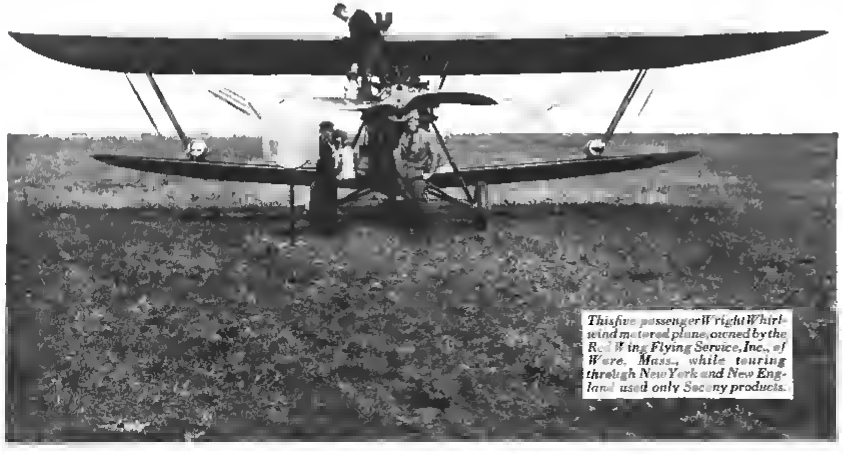
Now uses Socony



This five passenger Wright Whirlwind motored plane, owned by the Red Wing Flying Service, Inc., of Ware, Mass., while touring through New York and New England used only Socony products.

"WE have tried numerous aviation gasolines and oils," said Roy Ahearn, chief pilot of the Red Wing Flying Service, Inc., of Ware, Mass., "but we have always come back to Socony products. Our advance purchasing man has orders to buy only Socony in New York and New England."

This is the opinion of a crack pilot who has had more than four thousand hours of flying to his credit, and is a member of the famous Caterpillar Club.

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You too will find that Socony aviation products will withstand the severest tests a plane gives them.

SOCONY

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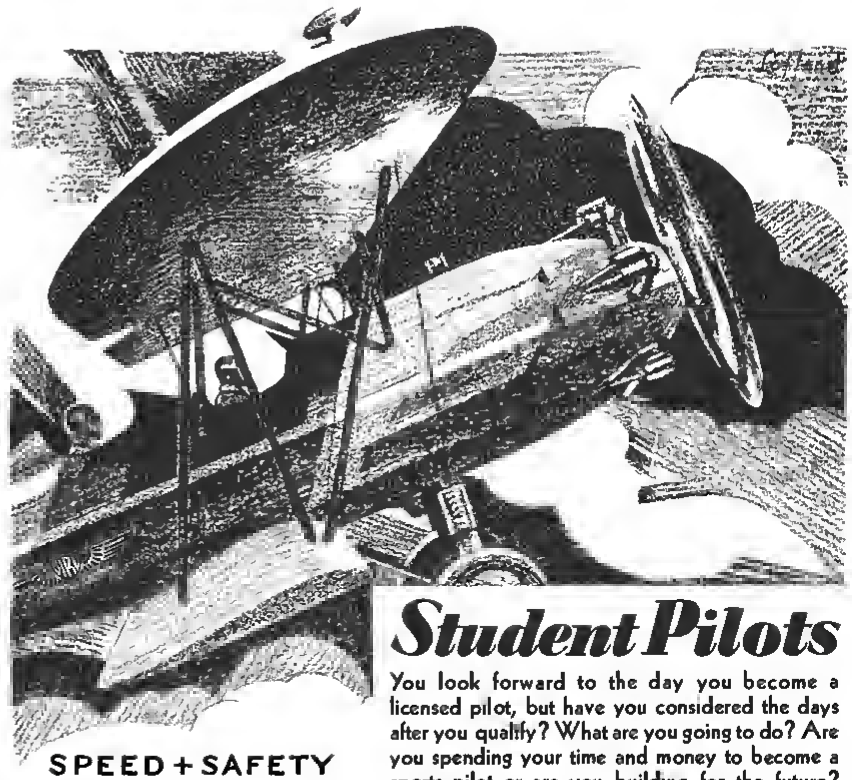
AVIATION GASOLINE AIRCRAFT OIL

STANDARD OIL COMPANY OF NEW YORK



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Ever since the first Brunner-Winkle BIRD took the air it has held the standard for performance with safety

Its internal construction, its wing design, its inherent stability—every item of its design and assembly have lifted this plane to its superior position in the popular priced class

And now the NEW BIRD powered by Kinner 90 H.P. (Approval Certificate No. 239) will win even higher praise for its ECONOMY with SAFETY and PERFORMANCE!

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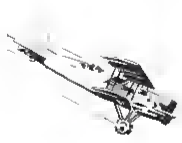
Write today and tell us about yourself—the number of hours of instruction, when you expect to qualify—and we'll show you how others are making money on this plan.

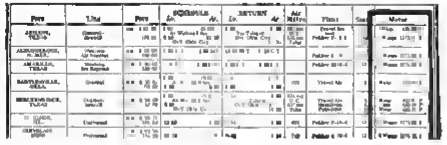
BRUNNER-WINKLE AIRCRAFT CORPORATION

17 Haverkamp St., Brooklyn, N. Y.

BIRD

Safety Performance





From Kansas City
One of America's great air-centers go 46 routes

And every line is powered with "Wasps"

A DAY to the west lies Los Angeles. A half day to the east—Cleveland. To Dallas in 7 hours. To Chicago in 4. Here in Kansas City, where 46 routes now converge, there has developed one of the great centers of America's new transport system—the air. A glance at the combined timetables of these transport lines reveals a significant fact. Every single line leaving Kansas City is now using Pratt & Whitney "Wasp" engines.

Here is a tribute not only to the unusual reserve of flying power of "Wasps." It is a tribute to the care which the great transport companies are taking to insure the utmost of dependability in every ship that flies.

THE
PRATT & WHITNEY AIRCRAFT CO
HARTFORD · · · CONNECTICUT
Division of United Aircraft & Transport Corporation

Manufactured in Canada by The Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Quebec; in Continental Europe by The Bavarian Motor Works, Munich

Wasp & Hornet ENGINES

Phillips 77 AVIATION

THE GASOLINE THAT CARRIES THE MAIL

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PHILLIPS
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The Irvin Air Chute is contained in a compact package strapped to your body. When released the parachute springs out of its pack, fills with air and lowers you gently to earth.

EASY *to* OPERATE

ONE PULL ON THE RING AND THE PARACHUTE OPENS

Simplicity is the outstanding characteristic of the Irvin Air Chute, both in its construction and its operation.

To open the chute jerk the pull ring. One simple operation . . . no involved directions . . . just pull! Instinct alone will cause you to clutch at this readily accessible ring, and that ring is your passport to a gentle landing!

And an Irvin is almost as easy to replace in its pack. It is simple to fold and fits snugly in place all ready for the next time it is needed.

The Irvin Air Chute is available in seat, lap or back pack types. All Irvins are identical in construction and are made in two grades of fine silk, one priced at $350, the other at $290. Every one, regardless of price, complies with the standard U. S. Government parachute drawings.

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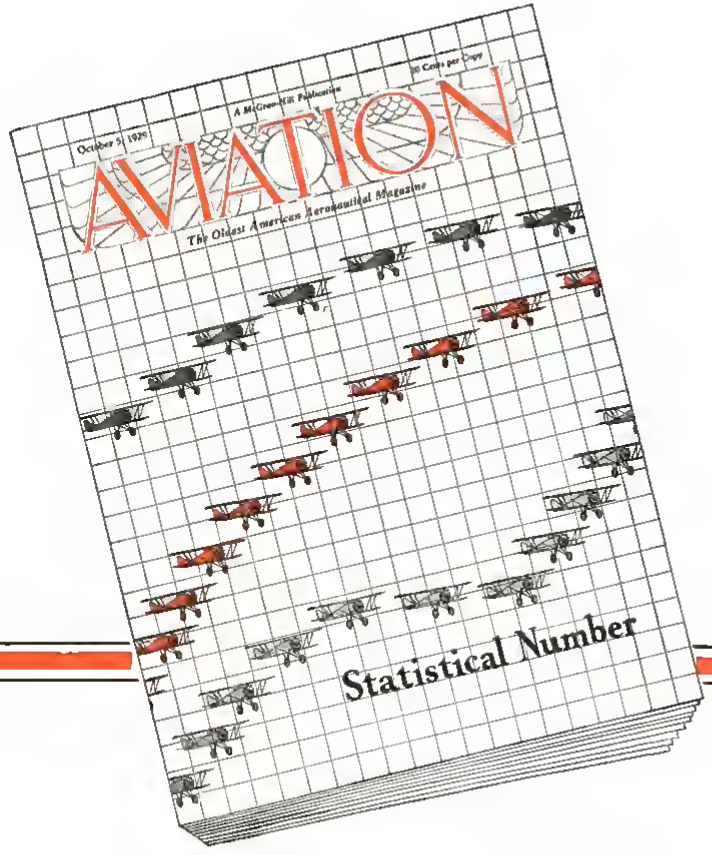
You will find that the Ford plane nearly flies itself. Carefully balanced controls save the pilot's strength on long cross-country flights. It has almost inherent stability, yet due to advanced aerodynamic design it is remarkably responsive to controls!

The extraordinary maneuverability of the Ford planes, combined with almost perfect stability in flight, and great structural strength, make them the pilot's first choice. Just as the safety, ample power reserve, all-metal construction, and economy of operation recommend them equally as well to the operating company. The Stout Metal Airplane Company, Division of Ford Motor Company, Dearborn, Michigan.

FORD TRI-MOTOR 5-AT

Span, 77 ft. 10 ins. Maximum speed, 135 M. P. H. Ceiling, 18,000 to 20,000 ft. Weight empty, 7500 lbs. Disposable load, 6000 lbs. Power load, 3 engines, 10.26 lbs. per H. P.; 2 engines, 15.42. Cabin accommodates 13 passengers, pilot and mechanics. Construction, all-metal throughout, exposed surfaces Alclad alloy. Power: 3 Pratt & Whitney Wasps, totaling 1275 H. P. Price, complete with standard equipment including instruments, seats, toilet, etc., fly-away Dearborn, $55,000

The AVIATION MARKET.....



In applying this information to the marketing and advertising of specific products and in estimating future markets, Aviation offers the service of its research department without obligation

How Big?

Here is a real yardstick! **The Statistical Number of Aviation, published October 5, contains the answer to questions which many manufacturers and distributors are asking.**

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Plane production and license data, by type, carrying capacity and territories. Licensed planes, by types

Licensed planes and engines, by makes and territories.

Engine production by horsepower and valuation; Engine designs, by types and power.

Aircraft delivery and licensing "seasons."

Weekly growth of pilots' and mechanics' licenses and students' permits.

Four-year growth of lighted airways, airports, commercial airways, transport operations, flying schools, etc.

Airplane design tendencies, by seating capacities and types.

Airport and landing field distribution.

Monthly growth of airway mileage and operation mileage.

Military and naval aircraft development.

Aircraft and engine exports, by number and valuation.

Expenditures by foreign governments and foreign air transport operations.

The data in this issue will be of great value to engineering and production executives as well as to sales managers, advertising managers and advertising agents in planning their sales and advertising programs. For this purpose the Statistical section has been reprinted. Single copies free on request; quantities 10 cents per copy.

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AVIATION

The Oldest American Aeronautical Magazine

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION — ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 27 . . . *November 16, 1929* . . NUMBER 20

Developing Specialized Transportation Facilities

PERHAPS aircraft will some day be the universal means of transportation, but that time is neither here nor close at hand. If we would see the aviation industry maintain a maximum rate of growth we must concentrate on developing those particular phases of transportation to which aircraft are most applicable. It has become evident that many things are possible through the employment of aerial transport which cannot possibly be accomplished without it, and it is upon these special situations that we should at present concentrate a special attention

A disastrous run on a large mid-western bank was stopped within a few hours recently by the arrival of $500,000 in cash by airplane from a great financial center hundreds of miles from the threatened banking institution. This occurrence suggests not only that airplanes may come to the aid of financial institutions in times of emergency, but that an intelligent development of the capabilities of the airplane as applied to the financial structure of the entire country, if not the entire world, may result in vastly increasing the fluidity of money. Improved transportation makes feasible an increased degree of centralization of cash reserves, and permits working on smaller local cash margins, relying upon speedy aircraft to bring actual cash if needed to support local credit. This development would be a logical extension of the principle that a greater volume of business on lower stock reserves means greater profits

Other applications of the airplane's good offices are suggested to us almost daily. Recently a western football team chartered two large transport planes and flew more than a thousand miles to a game with a rival college. The players were not thrown out of condition by a long train ride, they were back in school without losing any time from their classes, and the novelty of the stunt increased the crowd's size at the game itself. A movement is now on foot in major league baseball to form a country wide circuit which will make it possible for two or three large Pacific Coast cities to participate by the use of aerial transport. It is evident that the time is close at hand when the airplane will play a major part in sports development the country over, increasing public interest in various sports and helping to develop a healthier and more active people.

IN THE medical profession we can forecast the most widespread development of the use of aerial transportation for the relief of more persons, more quickly, and in more widely scattered places. There are many examples of lives saved in thinly populated regions of the country through medicines or doctors rushed through the air, and there are instances of great specialists who have been able to open offices in two or more of leading centers of population and personally attend patients in each city by flying from office to office

Not long ago a party of wealthy hunters chartered a large transport plane during deer season, flew several hundred miles to an isolated region, and returned three days later with six deer. We mourn the mounting civilization which dooms our wild life, but so long as sportsmen follow the chase and so long as its devotees seek to get a maximum of sport with a minimum of lost time, aircraft can be of the greatest service to hunters, fishermen, or lovers of the outdoors

These are but a few outstanding examples of the specialized services which aircraft can render. Until such a time as air transport has been so developed as to largely supplant surface travel it would seem wise for aircraft builders and operators to study closely those special cases where the airplane can do a job better than any other vehicle, and to call attention to such application of its services.

Multi-Engine Safety

THE ADVOCATES of single-engined and of three or four-engined transport planes are battering away at each other as usual Ever since the multi-engined machine for passenger carrying became a reality they have been enjoying a veritable Donnybrook Fair The struggle has not been purely a civil one The vehemence of their mutaul assault upon each other's pet fancies has been paralleled by the enthusiasm with which the military and naval supporters of single-engined and twin-engined bombing planes respectively have upheld their favorites.

It frequently happens that to define the cause of a dispute is to discover that it has no cause. It is partly so here Admittedly there is merit on both sides, but when the arguments have been assayed it is commonly found that the parties belligerent have not been talking about the same thing

The believer in multiple engines takes it for granted that the airplane will be able to fly with a full load and any one engine dead That is the rock of his covenant His opponent espouses with equally warm conviction the contrary assumption, and both of them can adduce impressive quantities of practical experience to prove that their respective hypotheses coincide with the factual evidence in the case

During the ill-fated naval conference at Geneva two years ago a foreign representative seeking to pin Admiral Hilary Jones of the American delegation down very closely upon some nicety of definition inquired "What would you call a ship of 10,000 tons displacement and armed only with three-inch guns?" "I would call it," the Admiral unhesitatingly replied, "a joke." The anecdote suggests a definition with an aeronautical application

An airplane with a multiplicity of engines and unable to fly with any one of them stopped is a joke, albeit a poor and perhaps a tragic one.

To that sweeping statement there are, of course, possible exceptions, especially among twin-engined machines Two engines may be used to improve vision, or to secure better control when taxiing, or for various other reasons, but when the number is raised beyond two increased safety from forced landings must be a factor Which is to say, that it must be possible to dispense with any one engine without a then-and-there termination of the flight

This is a matter to be taken seriously. A multiplicity of engines can give a decided increase in safety of operation over bad country, but subject always to the stipulation of ability to fly with one power plant dead Furthermore, that ability must be maintained under the worst conditions The plane must still be able to get along without one engine over the highest ground that it must cross in its regular operation. A three-engined plane having a ceiling of one thousand feet with two engines running is a very poor safeguard over the Rockies

About the possibility of meeting the fundamental conditions there is no doubt There is no great difficulty in doing it, but it does impose a limit upon the load to be carried Designers must frankly accept the limitation, and they must never dream of violating it That it has been conspicuously violated and even ignored in some cases in the past a certain number of tragedies have attested. Regulative authorities should make it their business to see that there is no opportunity for similar mishaps, or for any forced landings due to the loss of a single power plant in the future. Of all the rules that surround the National Air Tour there is none more worthy of commendation than that which calls for a direct practical demonstration of the ability of each multi-engined plane entered to fly and maneuver satisfactorily with each engine cut off in turn It deserves not only commendation but also emulation We suggest to the Department of Commerce that a similar test should be applied to all multi-engined machines coming up for approved type certificates If it cannot be met both the certificate and the license of every plane built thereunder should clearly indicate the inability to fly with full load and one engine missing

//

Good News

A DEFINITE slowing down in the aircraft market, while a real tragedy to companies in a poor position to meet reversals, may in the long run be a good thing for the bulk of the aviation industry Since the aviation boom started it has been generally conceded that a "shaking down" would eventually take place That condition seems now to be on the way, and it is only natural that much gloom is being dispensed by the weaker companies which will bear the brunt of any "shaking."

Those organizations alive in the industry five years from today will be the ones which have believed in first principles first, the engineering of a quality product and a product for which there was some immediate market, economical and conservative production methods, proper attention to marketing and field service, and, above all, a sales and advertising plan aimed at the future time, now apparently arrived, when the sale of airplanes will meet a normal resistance and will present a normal merchandising problem having to be attacked on normal lines

The present "unexpected sales resistance" which manufacturers of the popular type of airplane are now experiencing is a symptom bound to be displayed by a young industry suffering with acute growing pains Those concerns which survive all flurries will be not only the strongest, but the ones with the most constructive sales methods and the best service to the user of the products This is quite as it should be, and points the way for a bigger and better aviation industry which will from now on fight in every sensible way to gain for the airplane its proper place in our present civilization.

The aviation industry is now in precisely the position of an army that has been maneuvered through a long campaign to the eve of a decisive battle Leaders in the aviation world have been maneuvering for the past two years with the contsant knowledge that a great sales battle was impending, the outcome of which would permanently establish the industry on something like its rightful plane For the bulk of the industry to show gloom and discouragement because the anticipated condition is here would be as sensible as for the army to exhibit fear and trembling because the planned-for encounter is met.

Much as we must sympathize with those who will be eliminated it is good news to know that the aviation industry will face the future as a stronger, better equipped and closer knit body than has ever before been the case.

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More Work for the Department of Commerce

AIRPLANE PERFORMANCES ought never to be classed among light fiction When the maximum or minimum speed, the rate of climb, the take-off run in calm air, or any other characteristic is stated or advertised for a type of machine that is in full production, we should be able to accept it without question We *should* be able to, but we have far to go before we shall

Performance figures for commercial airplanes are often strongly tinctured by over-optimism, and occasionally there are indications of deliberate fabrication That is fortunately rare, and as a general rule there is plenty of evidence that the unduly sanguine manufacturer is deceiving himself more completely than he is anyone else The majority of the aircraft factories of the United States have no one upon the staff who is competent to run even a simple performance test with all the needed calibrations and corrections taken into account, and not ten per cent of them number employees with enough research experience to devise and apply successfully a proper method for making an unusual and complicated determination such as that of true landing speed Since it is the usual tendency of uncorrected results to err on the side of optimism, most of the discrepancies between manufacturers' claims and unbiased performance tests, if they are later made, account for themselves without seeking any more sinister explanation With the best will in the world, ignorance of proper methods and lack of proper instrumental equipment often intervene to produce fanciful figures.

The circulation of inaccurate data, or the presentation of exaggerated claims indistinguishable in form from sober statements of carefully measured performances, is palpably unfair to the conscientious adherent to positively known facts To single out the sheep from the goats, and to make it possible to get figures with the seal of indubitable accuracy upon them, performance tests must be conducted and certified by unprejudiced parties There is no other way.

Who then should it be? The Army and Navy are thoroughly habituated to performance testing, but they are busy with their own work and should not be saddled with a regular commercial job The National Aeronautic Association has been suggested, but it lacks both specially trained personnel and special equipment The certification of world's records is simple compared with the making of a really complete performance determination Privately owned testing laboratories are coming into the field, and they have possibilities, but it will take years for any one of them to become so widely known, and build up so great a reputation, that its stamp on a performance report will be taken as an unchallengeable hall-mark. In the meantime we must have something

There remains the Department of Commerce. The Department's representatives already have to make certain flying tests of every new type to determine its safety before granting an approved type certificate To measure performance, at the request of the manufacturer and at his expense, would be a natural extension In the Bureau of Standards, the Aeronautics Branch would have available a trained scientific organization to develop methods, calibrate instruments, and instruct personnel The Department of Commerce is charged by law with the development of commercial aviation providing the purchaser of aircraft with reliable data upon the respective capacities of the various types offered for his consideration would be an activity strictly in line with the general mission so assigned

We are well aware of the magnitude of the burdens that the Aeronautics Branch already carries We are loath to suggest that there be addition to their number, but we are very conscious of the importance of getting better performance information We want to feel that American performance statements set a world standard, accepted in foreign countries without question of verification There are companies of which that is true now, but there are others for which no such ambitious claim can be made We should be only too glad, for the protection of the careful and scrupulous, to adopt a policy of opening these columns only to figures certified by authority both impartial and competent,—but no such figures are now to be had The finger of destiny plainly beckons the Department of Commerce to the assumption of the task

WANTED... A SOLUTION OF THE Used Plane Problem

By CHARLES F. McREYNOLDS
Pacific Coast Editor of AVIATION

AFTER the last two years of mounting new plane sales western aircraft distributors are finding the used plane problem to be of growing importance. Where a year ago it was necessary to take in a used plane on but one in ten new plane sales, the ratio has risen until Southern California distributors are accepting used planes in fully half of their new plane transactions. More and more the problem of trade-in price, reconditioning, and re-sale of these used planes is occupying the attention of distributors in markets where considerable airplane selling has been accomplished. Soon the trade-in practice will be as common as it has become in the automobile business. Not only will this be true of the Western territory, which has met the problem first because of higher sales per capita, but it will be general throughout the industry.

Edward L. Erickson, sales manager Ruckstell Aircraft Corporation

Unique problems are presented by this growing phase of airplane merchandising. Problems never before encountered in any other branch of selling or in the handling of any other commodity. It is possible that the entire present structure of aircraft sales organizations will have to be altered to successfully meet this approaching condition. Certainly the Department of Commerce Aeronautics Branch, with its effort to properly inspect and re-license all planes which have been repaired or reconditioned, is faced with the necessity of tremendous expansion as the number of planes in use, and the number of planes being rebuilt and re-sold, increases. Particularly will this be true if all states follow the lead of California and pass laws prohibiting the operation of any plane within their borders unless that airplane has been inspected and licensed by Federal officials. It is also true that unless both distributors and manufacturers plan now for the handling of second hand airplanes a condition may arise such as the automobile industry has been through. Literally hundreds of automobile dealers were forced to the wall during the most acute stages of the used car problem, because their eagerness to make new car sales lead them to accept trade-ins at abnormally high prices and thus glut the second hand car market. This situation was allayed only after the dealers took the bull by the horns and cut trade-in allowances drastically.

However, the airplane dealer is faced with problems which could never be associated with automobiles. The auto merchant has a habit of taking an old car, giving it a quick paint job, a dose of penetrating oil to eliminate squeaks, some new looking tires of the cheapest sort, and then pushing this rejuvenated vehicle back on the market at a price which makes the deal profitable. Thus, thanks to Department of Commerce inspectors, the airplane dealer cannot do. A used airplane, taken in trade, must be completely inspected and re-conditioned to the satisfaction of inspectors who know how to pick the hidden defects and deficiencies, before that plane can be sold as a licensed machine to the prospective purchaser. There are at the present time very few airplane dealers who maintain equipment and personnel to properly so recondition used planes. As a matter of fact none but the large and prosperous distributors of aircraft can even keep a supply of spare parts on hand for the product which they may handle. It is evident that used planes must be kept in circulation if the sale of new planes is to continue in any quantity, but unless steps are taken the industry may soon find considerable stocks of new planes frozen in the hands of many small dealers unable to make sales because of poor facilities for handling trade-ins. Since new airplanes quickly lose value because of the rapidity with which new models obsolete those of a few months earlier design, the industry cannot afford to permit such freezing of stocks. In bringing greater speed to modern travel the airplane has automatically increased the tempo of industrial life, and with this quickened tempo the aeronautical industry must keep pace. Design, manufacture, sales, and re-sales, must be kept in a condition of fluidity.

A section of the rebuilding shop of the Western College of Aeronautics. Below: Testing a magneto in the shop of the Aero Corporation of California

There are three general trends now apparent, all working toward the solution of this one problem. One is the establishment of used plane centers, where airplanes will be taken in on consignment to one centralized repair and sales center, equipped to recondition used planes and specializing in the sale of such craft. Another trend is toward the strengthening of the distributor-dealer organization, with all trade-ins going direct to the distributor, who alone maintains equipment for complete rebuilding and so takes this burden off the small dealer. Still another move, which may eventually prove to be the solution of the problem, is the establishment of factory branches with facilities for the complete repair and rebuilding of planes just as such branches have been established for handling engines.

Perhaps the first recognition of the possibilities of profit in exclusively used plane sales was given by E. L. Erickson, for 20 years an automobile dealer, and later a member of the Lockheed sales organization. In January of this year Mr. Erickson found it necessary to dispose of two used planes in order to complete the sale of a new Lockheed plane. He sold the used planes quickly and at such a profit that he decided to launch out into the business of handling used planes only. After opening an office at the Los Angeles Metropolitan Airport, Mr. Erickson wired a number of eastern people and arranged to take on consignment planes from Detroit, Wichita, and Omaha. Further contacts were made with transport lines, finance companies handling airplane paper, airplane factories, and some distributors who could not afford to be bothered with used planes at that time.

Where these used planes had been a drag on the organizations not equipped to handle them, Mr. Erickson built up a shop staff which made it possible to efficiently care for this class of work. By specializing in used planes he gained the reputation of having good equipment for sale at bargain prices. From January to July of this year 28 used planes were sold for a total of approximately $100,000. Many of these sales were financed through the same groups that specialize in time plans for new plane sales.

Mr. Erickson has now merged his activities with those of the Ruckstell Corporation, Ltd., Aircraft Division, also located on the Los Angeles Metropolitan Airport, with which firm he has continued as sales manager. The Ruckstell company is now handling an average of six used planes a month, ranging in value from $1000 to $22,000. The method followed is either to accept a plane on consignment, re-conditioning and re-selling it for the best possible price and taking a percentage on the sale; or to buy a used plane outright, after thorough inspection by an expert mechanic, and then to re-sell it for profit after satisfying Department of Commerce inspectors as to its condition. In one extreme case it was necessary to postpone the resale of a plane three times until the inspector was finally satisfied and a license was authorized. Such a delay is not disastrous for the large organization handling planes in quantities and close enough to an inspector for re-inspection with-

out appreciable delay. For the small dealer in an outlying town, whose investment might be tied up in a plane so re-conditioned, it would be a very grave matter indeed if the Department inspector should fail to pass the job for re-license. It is just such possibilities that make the establishment of large used airplane centers practical.

A similar plan is the airplane rebuilding shop which handles work for many small dealers on a straight pay-as-you-go basis. This makes it possible for the small dealer to take in a used plane, have it rebuilt by an organization sufficiently well equipped to assure re-licensing, and then to re-sell the plane at a profit. Of course the proper appraisal of the plane taken in is of the utmost importance. All dealers must be fair enough to themselves to allow no more on the trade-in than will leave a comfortable margin for repair and re-sale at a profit, or their already small percentage on new plane sales will be pared to a dangerously low figure.

The Western College of Aeronautics is one organization which has contracted for a great deal of such work and has had as many as 17 used planes in the shop at one time. Of course much of the work is done by school students, but the situation is a happy one because in order to properly carry on certain instruction it is necessary to afford the classes practical experience with many types of aircraft. Since the completed job must be inspected and passed by qualified Government officials the plan is safe enough for the ultimate purchaser and probably will always be continued to some extent.

Two Southern California organizations, the Aero Corp. of California, Eaglerock distributors and the American Aircraft Corporation, Waco distributors, have found it profitable to build up fully equipped repair shops of their own. The Aero Corporation of California maintains a field apart from the main operations base, expressly for the overhaul of planes. On this field is located a plane and engine shop and all used planes taken in on new plane sales are given a complete inspection and overhaul. This method has the advantage of giving the distributor any profit which might exist from the conduct of such a shop, and also serves to tie his dealers more firmly into the organization through the help that can be given on appraising, conditioning, and selling of second hand planes.

Under the direction of E. Burrell Smith, sales manager, the Aero Corporation sales organization has firmly held the price on trade ins down to a point to guarantee sufficient margin for the complete reconditioning which is necessary. On the average it has been found that a used plane of the conventional three place biplane type, if in poor condition but not "cracked" or actually damaged, will cost from $300 to $500 to recondition. Of course damaged machines may often run into more money.

Planes reconditioned by the Aero Corp. of California

It will probably never be possible to establish a scale of trade-in prices on airplanes such as automobile dealer has in his Blue Book of used car values. Each transaction must be taken separately and an allowance fixed only after the most rigid inspection. The satisfaction of the customer and the existence of the dealer both rest upon the justice of this trade-in allowance.

The American Aircraft Corporation sold almost 100 new Waco planes during the year 1928 and so was early faced with an accumulated stock of used planes taken in trade. Jack Duelks, sales manager, started the practice of advertising regularly in the classified columns of the Sunday papers. Of course all used planes were reconditioned and sold with a guarantee to be eligible for license, but in addition to this it has been Mr. Duelk's policy to go very thoroughly into each used plane's condition with the prospective purchaser. By pointing out each place in which a repair had been made or a worn part replaced the customer was acquainted with the plane's possibilities and limitations for continued use. This policy is, of course, just the opposite of the average automobile dealer's practice of covering up defects, but the result is to give the buyer confidence in both the plane and the organization selling it, and if the transaction is completed it is certain that the customer will be satisfied. This plan is used as a direct stepping stone to greater new plane sales, because the used plane buyer usually returns before long for the purchase of a new plane, if satisfied with the service he has received.

Most used planes taken in trade by both the American Aircraft Corporation and the Aero Corporation of California have been sold to students wanting a plane in which to pile up time for a transport license. Sometimes three or more students will club together for the purchase of a used plane in which to gain additional solo hours. With mounting experience each of these students soon becomes a customer for some new plane and if the seller of the used plane has been fair he should be able to count on his used plane buyers as new plane customers.

If large distributors do not properly prepare to take care of themselves and their dealers in the handling of trade ins it may become necessary for the factories to establish authorized overhaul and reconstruction depots at strategic points. Such a plan could easily be instituted, for instance, by the Curtiss group which now operates 40 different flying centers. Especially where one group controls the manufacture and sale of several different planes, this branch plan might prove most efficient, for the volume of business through any one branch would be greater in proportion to the greater number of products allied, and certain economies could be effected.

As in the automobile business the crux of the problem is in the amount of trade-in allowance granted. Dealers bidding too high for old planes in order to make new plane sales, will automatically eliminate themselves from the picture, because of inability to properly overhaul such planes and still re-sell them at a fair price to the used plane purchaser. If the industry is to stay on an even keel trade-in allowances must be kept as low as fairness to the used plane owner will permit.

Training Pilots

FOR AIRLINE OPERATION

Colonial Flying Service Schools Employ the Gosport System in Preparing Pilots for Work on Colonial Lines

By Maj. Charles H. Woolley
Director of Schools, Colonial Flying Service, Inc.

Colonial Airways was the first of the eastern operating companies to enter the field of flying instruction. The company realized the absolute necessity of developing a type of transport and mail pilot who would combine the best features of the navigator of a steamship and the crack express engineer of a railroad while retaining the spirit which prompts young men to enter the world of aviation.

Maj. Charles H. Woolley

A transport pilot must possess, in addition to his flying ability, a high sense of responsibility for the lives of his passengers, the transmittal of the mail, and the equipment which he uses.

An inadequate supply of such men in this country, and the ever-increasing demand for pilots as the air mail and passenger transport grows, impelled officials of the Colonial company to decide to take over the training of their own pilots. This policy is already bearing fruit, and Colonial now has the prospect of having its planes flown by men trained under the company's own supervision.

Inasmuch as instruction is given for private pilot's license, and a limited commercial license, the courses are not confined to those who wish to become transport pilots.

In addition to being the leaders among operating companies in the east to train men, Colonial is also introducing, it is believed, for the first time in this country, a coordinated system of instruction given in all types of planes by the very pilots who are operating them on mail and passenger runs. The Gosport System, after a study of other methods of flight instruction, was finally adopted by Colonial for use in its new schools. Evolved during the War, the Gosport System was used with great success by the Royal Flying Corps. Its great practical value lay in the fact that being absolutely uniform, the pilots could begin their training in England and complete it in aviation fields behind the lines. It also is valuable in that it turns out pilots who make good instructors. The conspicuous feature of the Gosport system is that it permits the pupil to be under verbal direction at all times. The student and instructor wear speaking tubes, and the instructor says what is to be done and then criticizes the execution, instead of having to depend upon general gestures in the air and a long explanation and criticism of the whole flight after returning to the ground.

Frank Little, one of the company's original air mail pilots, was chosen by Colonial to incorporate the Gosport System in the courses given by the Colonial schools and to teach the other instructors. Little learned to fly in the Royal Flying Corps and was himself instructed by the Gosport System.

The instructors who are working under Little's supervision have been chosen with three essential qualities in mind. They must possess a complete and accurate knowledge of aviation in all its major branches; they must be able to perform perfectly what is to be taught and do so automatically, and they must be able to explain the subject in such a way that it may be clearly understood by the student.

Two manuals, one for students and one for instructors, are used. The instruction, following these manuals, is absolutely standardized. A student can start in one school and finish in another without any loss of time. It enables the directors of schools to determine whether each pupil is making due progress and it permits the director to keep a careful check on his instructors.

In the manual for the teachers, the instructors are urged to study carefully the individual characteristics of their pupils. They are also advised to win the confidence of their pupils for, as the manual points out, no pupil can learn to fly from a man in whom he does not have absolute trust.

Instruction is being given in Colonial schools following a sequence of eighteen steps. Each pupil is carefully

taken through all of them, length of time for the total instruction period varying with the pupil's aptitude

The sequence is as follows:

1. Taxiing and handling of engine
2. Demonstration of effect of controls (with and without engine)
3. Straight flying, level flying, climbing and stalling
4. Gliding straight
5. Taking off into wind
6. Landing into wind and judging distance
7. Turns up to 45 deg.
8. Gliding turns
9. Turns over 45 deg., with and without engine
10. Spinning
11. Elementary instruction in forced landings
12. Solo
13. Climbing turns
14. Side-slipping
15. Taking off and landing across wind
16. Acrobatics
17. Advanced instruction in forced landings
18. Low flying (i.e., correct turns at low altitudes)

The first four steps are taught on the ground as much as possible. The student is urged to sit in the plane and handle the controls until at the word of command he automatically moves the rudder-bar or the stick in the correct manner. Starting with the fifth step, the pupil takes the plane into the air himself, and as soon as he has demonstrated his ability in taking off, straight flying and climbing, he is permitted to land the plane. Instruction in landing is interspersed with Nos. 7, 8 and 9.

While the student is studying turns over 45 deg., he is taught the reasons for spins and how to get out of them. Extremely important points in the instruction are the teaching of spins and even of forced landings before a pupil is permitted to solo. The Colonial teaching staff feels that many of the crashes experienced by student pilots on their early solo flights can be eliminated through a little preliminary training in forced landings.

The other steps seem self-explanatory, with perhaps the exception of the final, which Colonial officials also feel is extremely important. Many student pilots after executing a bad turn find themselves too near the ground, and experience in flying at low altitudes will eliminate many stalls and crashes.

Colonial in its teaching stresses ground work perhaps more than any other flying service. The continued relationship between student and instructor in discussing flying from all its angles, and in going over and over various types of ships while on the ground, gives the student a much wider theoretical knowledge of the principles underlying flying than can be gained in the air.

Instructors are directed in case of any accident to hold an immediate investigation. Upon ascertaining the causes, all the students on the field are gathered together and the reason for the accident explained in detail. This eliminates gossip among the pupils and prevents them from becoming upset and panicky. The words "danger" and "nerves" are never used. When a difficult maneuver is being taught a student, he is not told that it is dangerous but is instructed thoroughly in the correct method of performing it. The pupils are impressed with the fact that most accidents are caused by ignorance on the part of the pilots, and that the airplane is a mechanical contrivance which does only what the pilot himself makes it do.

Jack Little of Colonial Flying Service at the controls of a Fleet sport plane used by Colonial for student instruction

BEFORE the pupil starts his instruction in the air he is taken up several times as a passenger to accustom him to the sensation of flying. When his instruction starts, it is in an open-cockpit dual-control training plane. Instruction is carried on by the use of ear phones. Directions are given by the instructor in accordance with the definite "patter" which is another feature of the Gosport System.

All the time the plane is in the air the instructor is talking in a slow, calm voice to the pupil, explaining each movement of the controls and the corresponding reaction of the plane. In this manner the pupil learns to fly by instinct, and when flying solo he will continue in imagination to hear the words of his instructor telling him the correct way to maneuver his plane. The standardization of this "patter" enables one instructor to take on the work where another has left it off and permits the director of schools to take up for occasional check pupils who have reached different stages of flying ability. Instruction at all schools is frequently checked by the director.

As the pupil progresses, he is advanced in the type of plane he operates. The instruction begins in a Fleet biplane, an open-cockpit training plane. When the pupil has shown himself adept at handling the Fleet in solo work, he is promoted to a Pitcairn open-cockpit mail plane, also equipped with dual control. A Fairchild cabin plane, used by Colonial in its regular mail service, is the next step. These planes are also equipped with dual controls.

Those pilots who decide to continue their work to qualify as passenger transport pilots on Colonial and other lines will take a post-graduate course on multi-engined planes. Before they will be permitted to start their training on such planes as the Sikorsky and the Ford, they must have a Department of Commerce Transport license.

This projected post-graduate course is in anticipation of more rigid requirements by the Department of Commerce for transport pilots in the future. Indications from Washington at present are that various types of transport licenses will be issued—a full license permitting a pilot to operate day and night, and several types of limited pilots' licenses allowing piloting by day only or as a co-pilot.

A line up of planes used by Colonial Flying Service. Right to left: a Commandaire, a Fleet, a Pitcairn, and a Fairchild

FOUR courses in all are given by Colonial Flying Service at its schools. They consist of the course for a Private Pilot's license, for a Limited Commercial license, for the Transport Pilot's license, and the post-graduate course outlined above. The fees for the various courses range from $525 for the first to $4,500 for the transport license.

The course for the private pilot's license consists of 18 hours in the air, of which 8 must be solo and 42 hours of ground training. The limited commercial course consists of 50 hours in the air and 70 hours of ground work, while for the transport pilot's license 200 hours of flying are required in addition to 115 hours of ground work.

The post-graduate course will consist of a minimum of 500 hours in the air and 200 hours ground work. In each case should the instructor become convinced that the pupil does not have the necessary requirements for a pilot, the student is immediately dropped. A nominal fee is charged for enrollment, the balance not being collected until the student has demonstrated that he has the makings of a pilot.

All courses given by Colonial Flying Service have been prepared as a result of a careful study of the Department of Commerce requirements and the application of results of this study to instruction by the Gosport System, consideration being given to the various classes of machines used. All include a wide range of theoretical and practical subjects including shop work on engines and on planes of all types, meteorology, navigation, use of the compass, parachute and radio and a survey of airports. Ground work, wherever possible, is coordinated with the aerodynamic instruction being given in various educational institutions. Colonial's first school established in Buffalo works very closely with the University of Buffalo, the ground school work being given under the direction of Prof. W. H. Taylor. Conferences are now being held with Dean Ellery of Union College looking to the inauguration of a school in Schenectady, while ground courses are being discussed with the officials of the University of Rochester in that city, where Colonial has also established a flying service.

I personally feel that aside from the tremendous value of the standardized method of instruction and the co-operation of leading educational institutions, our pupils will benefit most by being able at all times to watch our regular work. Being on the fields where mail and passenger planes are constantly arriving and leaving, being able to watch the mechanics checking and refitting the engines and planes should give the pupil a practical knowledge of commercial flying which he could never get from a text book or verbal instruction. He cannot help but absorb a large part of the technique involved in operating mail and passenger lines. He will gain a knowledge of airport construction and management which will help him when, and if, he becomes one of our regular mail or transport pilots.

For the protection of both pupils and Colonial, an unusual insurance feature has been developed in connection with the schools. Close cooperation with insurance underwriters and strict adherence to their suggestions and standards enables Colonial Flying Service to offer greater accident coverage than usual. This is given without additional expense to the student, and permits a young man of moderate means to borrow money to complete his training by naming the lender of the money as his beneficiary in case of accident to himself or to private or public property.

ALTHOUGH Colonial Flying Service is still comparatively young, our experience to date has convinced us that for their own protection operating companies will find the solution of the problem of securing reliable pilots to be the establishment of their own schools. Colonial has also discovered that a coordinated method of instruction such as the Gosport System produces far better pilots than the methods employed now by so many different individual schools throughout the country. We do not expect of course, that every man we train will enter our service but we are confident that within a comparatively short time our planes will be piloted to a large extent by men who have received their instruction from other Colonial pilots in Colonial planes under the direction of Colonial school officials.

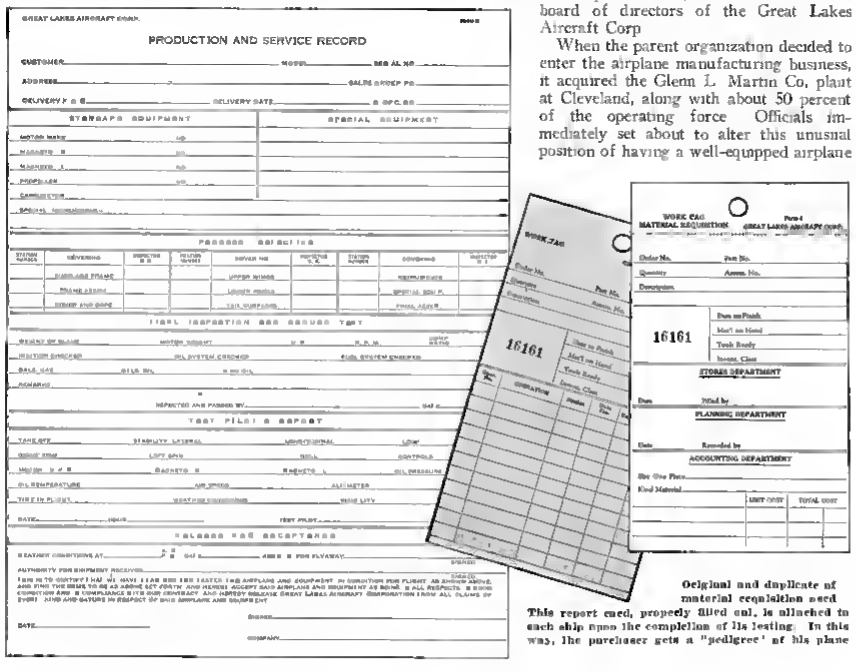
Production Methods AT THE GREAT LAKES AIRCRAFT PLANT

By Walter E. Burton

THAT airplanes can be built on a quantity production basis very much like automobiles, is being demonstrated by the Great Lakes Aircraft Corporation of Cleveland, Ohio. In slightly more than a half-year of operation, this company has become the largest producer of training planes as gauged by daily output, and is well on the way toward first place in the number of planes of any kind turned out per day by any single manufacturer.

The Great Lakes Aircraft Corp. is a subsidiary of the Allied Motor Industries Corp. of Detroit, of which William Robert Wilson is head. Mr. Wilson, incidentally, is well known in automobile circles, having been in charge of Dodge Bros. production from 1913 to 1918, and president of the Maxwell Motor Co. prior to its acquisition by Chrysler. He also was president and chairman of the board of the Murray Body organization. At the present time, he is chairman of the board of directors of the Great Lakes Aircraft Corp.

When the parent organization decided to enter the airplane manufacturing business, it acquired the Glenn L. Martin Co. plant at Cleveland, along with about 50 percent of the operating force. Officials immediately set about to alter this unusual position of having a well-equipped airplane factory and a force of workers, but no operating organization. Col. Benjamin F. Castle was selected as president of the new company. He was, at the time, head of the First Federal Foreign Banking Corp. of New York. He has had extensive flying experience, and was the first American government aviation attache. He attained the rank of Colonel in the United States army air corps, and was for a time chief of the Control Board, Army Air Corps. Colonel Castle is also treasurer of the National Aeronautical Association.

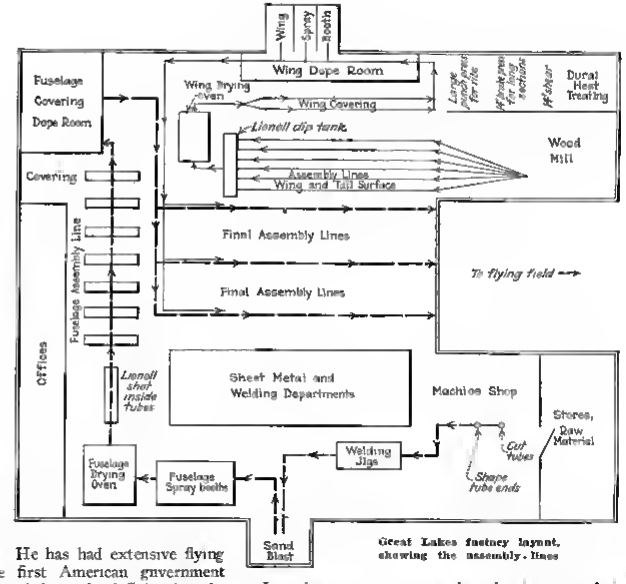


Original and duplicate of material requisition used. This report cued, properly filled out, is attached to each ship upon the completion of its testing. In this way, the purchaser gets a "pedigree" of his plane.

Selecting of the highly-essential engineering staff then took place. Capt. Holden C. Richardson, director of engineering for Allied Motors Industries, Inc., and formerly chief of the Design Division, Bureau of Aeronautics was assigned to direct engineering work at the Great Lakes plant. He has as first assistant, P. B. Rogers, who was in charge of wing design for Martin. Several other staff members were obtained from the Martin force.

If you were to ask who designed a particular Great Lakes plane, the answer would be, "the engineering staff." No plane is the product of one man, but represents the coordinated work of a group of specialists. For instance, some engineers specialize in wings, others in the undercarriage, a third group in power plants, and so on. In this way, the final product, instead of being designed by one man who might be weak in one phase, is the composite ideal of a number of specialists and is thus wholly sound.

When Mr. Wilson and his assistants had studied airplane production thoroughly, they came to the conclusion that, contrary to impressions that seemed to be extant, there is nothing very mysterious about the building of an airplane. Furthermore, a flying machine, even though it requires the highest quality of engineering and production work, can, like the automobile or other mechanical product, be turned out on a quantity basis without imparing its quality. So Robert M. Hidey, formerly works manager for the White Motor Co., and a man experienced in production control, was placed in charge of Great Lakes production.



Great Lakes factory layout, showing the assembly lines.

In order to turn out a product that is not made in job lots, but, like an automobile, is built to the best possible standards and then sold, the production engineers found it necessary to effect a complete reorganization of the plant. An exhaustive study was made of the path of travel of each individual part. It was found that some parts were veritable globe-trotters in this respect. Rearrangement of machines and production units immediately effected an overall saving of 25 per cent in factory space, this being equivalent to a factory addition of considerable area. Under the new system, some parts that had traveled 2,400 ft. before, now journey only 720 ft.

E. P. Campbell of the production engineering staff has applied a system of production control that requires the keeping of records to a bookkeeping basis, and does not involve the use of complicated charts.

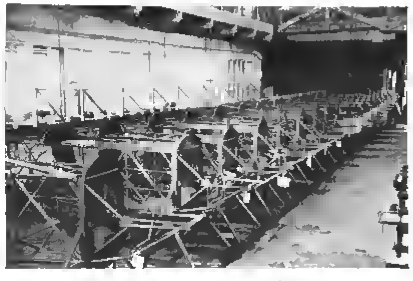
The general scheme is as follows. A card is prepared for each part that goes into a Great Lakes airplane. Data on the card include the length of time required to process the raw material, the length of time allotted to storing raw material, most economical number of parts that can be made with one tooling of machines, a schedule of dates upon which orders for raw materials are due, when a certain lot of parts is to be finished, number of parts rejected after inspection, and so on. Work orders, which can be written, if necessary, months ahead, are then prepared and sent out as required. These orders include an attached material requisition slip which is left at the stock room in exchange for specified raw material. The numbered work order tag is attached to the particular lot of parts it concerns. It contains space for order number parts number, date to finish, and several lines for operation data.

The production control system is basically the balancing of quantity against time limit. One of its advantages is the reduction of possibility of material shortage, because it gives a picture of a situation far enough ahead to permit adequate preparation.

The various plant operations necessary in the turning out of airplanes in quantity lots hinge about a system of assembly lines and overhead conveyors. Methods are very much like those followed in many automobile plants. For convenience, operations can be divided into two general parts, those pertaining to fuselage and those on wing and control surfaces.

First of all, raw material is received in the stock room and is immediately given an inspection as to quantity and general quality. Then samples are taken from each lot and sent to the laboratory for testing. While the metallurgist and chemist are determining whether the material comes up to Army and Navy standards, the recently-received lot is placed in the holding room. It is not released for factory use until a favorable report as to its quality comes from the laboratory.

The stock room is used only for raw material. After processing is done, finished parts are stored temporarily



The fuselage assembly room. A line of ST-1 fuselages ready for covering

in bins near the assembly lines, where they are soon used. In this way, production is kept moving and constant, and unnecessary storage is eliminated.

The fuselage of a Great Lakes airplane is built up of seamless chrome molybdenum steel tubing. After the tubing in stock lengths is released from the holding room, it goes to the cutting department where power hack saws reduce it to desired lengths. Then the ends are trued and shaped so that they will fit properly for welding.

The entire fuselage is assembled and welded on jigs. First the two sides are formed on separate jigs. Then they are placed on a revolving fixture, and transverse members are welded into place. Meanwhile, bulkheads, engine mounts and other smaller parts are built on separate jigs, and are brought to the fuselage fixture for attachment.

After fuselage welding is complete, the steel frame goes, on the overhead conveyor, to the sandblasting room. Here the surface is smoothed preparatory to spray painting, which takes place in the fuselage spraying booths. After drying in the fuselage oven, the frame is shot full of Lionoil under pressure. This material fills all inside tube cavities completely, preventing corrosion.

When the Lionoil treatment is completed, the frame is conveyed to the fuselage assembly line on dollies which support it during assembly line operations. These dollies are trucks built up of angle iron, with welded joints, and resting on rollers operating over steel tracks set in the factory floor.

As the frame moves down the assembly line, workmen attach the controls, install electric wiring, mount the engine (American Cirrus four-in-line air-cooled on the Sport-Trainer), put on the wood fairing—in a word, completely build up the body of the plane. Each group of men has a particular task or set of operations to perform.

At the end of the assembly line, a chute from the sewing department above brings the cloth body covering. This is attached, and the fuselage goes to the dope room where it is painted. Then it is taken to the main assembly floor to meet the wings, control surfaces and landing gear.

SIMULTANEOUSLY with the starting through of a particular fuselage, a set of wings and the empennage for it begin to take form in another part of the plant. From the wood-working department emerge the spruce wing spars. These spars and the wood fairing are about the only wood parts in the present type of plane being produced in quantity—the 2T-1 Sport Trainer.

Ribs are formed from sheet duralumin, and are stamped in a huge press in one operation. Formerly they were made by hand. There are five wing-assembly lines, the lines consisting of dollies mounted on rollers, similar to those for fuselage work. One of these lines is given over to the center section containing a welded duralumin gasoline tank. Each of the other four carries the upper and lower right, and the upper and lower left wings, respectively. Fitting of the spars and ribs, and covering of the wings require, in all, five distinct operations.

The gasoline tank requires special treatment. After it is built up, it is placed in a 10 per cent solution of sulphuric acid for one hour, being constantly agitated during this time. Then it is washed thoroughly in hot water, and finally is given a cold-water bath. This series of washings is to remove every possible trace of sediment that might later cause serious trouble by clogging fuel lines.

There is another assembly line in the wing department. This is for control surfaces. The framework for these surfaces is built up of duralumin pieces, and is then covered with cloth.

After passing through operations on their respective assembly lines, the uncovered wing sections and control surfaces are dipped into a tank of Lionoil, and are then dried in a heated chamber. The Lionoil forms a protective coating that wards off corrosion. Next the cloth covering is applied as the frames travel towards the doping room. After doping, the wings and tail surfaces journey to the main assembly floor to meet the fuselage bearing the corresponding job number. Here the plane is completely assembled, landing gear installed, engine and top cowling fitted, and is tuned up for testing. It is taken aloft and put through maneuvers which would show up any defects following the completion of a one-hour ground test. A detailed report is filled out by the test pilot and attached to the plane by a glassine-covered container. This record accompanies the plane to the purchaser and gives him a history of its performance.

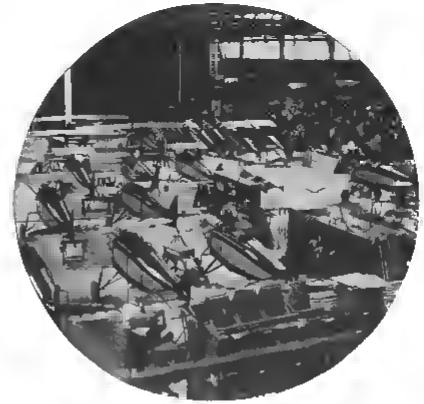
Through the numerous factory operations, the various parts are put through frequent inspections in order to

eliminate defects. Every precaution is taken to prevent deterioration of the plane in service. All duralumin wing parts are cleaned in oakite solution, and the entire wing assembly is protected by the Lionoil treatment. Small parts are zinc plated to prevent corrosion.

Operations on various portions of an airplane as they travel over assembly lines and conveyors are depicted in Fig. 1 prepared by Mr. Campbell.

The overhead conveyors represent one of the most recent and important of the many improvements installed at the Great Lakes plant. Conveyors run on a monorail track which is virtually an I-beam suspended from suitable supports. A wing, the fuselage or any other airplane part can be hooked onto one of more conveyors and routed to any part of the plant.

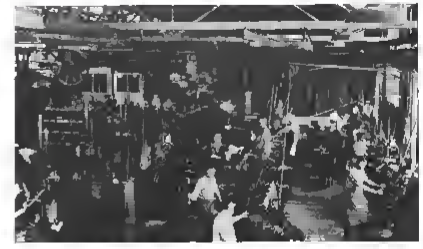
Not far from the main plant is a building that looks like half a barrel split lengthwise, and resting with the flat side on the ground. This is the experimental hangar, the only structure of its type in Cleveland. It is given over wholly to experimental work. Here, engineers have facilities for carrying on almost any kind of work in the developing of planes, accessory equipment, and other devices. Another hangar some distance away is used to house planes that are being tested, or that are being held for delivery. When a new plane is being produced, the order of events is, roughly, as follows: First the engineering department completes preliminary designs, working, as noted before, as a body of specialists with groups of engineers devoting their attention to certain portions of the projected ship. After wind-tunnel tests are completed on scale models, a full-size set-up is built, and



Final assembly floor, showing a number of ST-1 Sport Trainers being put together

from it detailed working drawings are made. Next, one or more full-size working models are built. These are put through a series of rigorous tests in the experimental laboratory and in the air. Any "bugs" that may be present are ironed out, refinements in design are made, and perhaps other advisable changes made. Finally, after the builders are assured that their new creation is the best that they can make, production is started.

The sales department deserves a share of the honors



The grouping of tools in the machine shop utilizes every available inch of floor space

for disposing of a record number of Great Lakes training planes, and for booking orders for other models. C. F. VanSicklen is vice-president in charge of sales. The Rankin Flying Service, operator of several training schools and originator of the Rankin system of training pilots, is the Pacific Coast distributor, covering Washington, Oregon, California, Idaho and Nevada. The initial order placed by Rankin was for 200 planes.

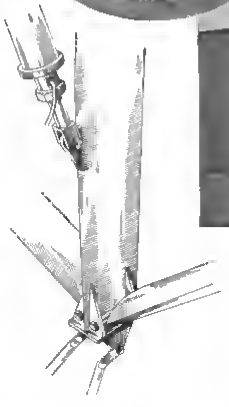
THE United Air Service and Transport Co. of Detroit has Eastern Michigan, Northwestern Ohio and Allen County in Indiana. The Central Air Terminals, Inc., of Chicago, headed by Maj. P. G. Kemp, one of the founders of Universal Air Lines, has the territory embracing Wisconsin, Minnesota, Northern Illinois, Northern Indiana and Western Michigan. New England states are covered by North Atlantic Aviation, Inc., of Boston. The Vance Air Service of Great Falls, Montana, has Montana, Wyoming and the western half of the Dakotas. The territory including Kansas, Oklahoma and Western Missouri is held by Beacon Airways of Kansas City. Remainder of the territory has not been allotted, although numerous applications are pending.

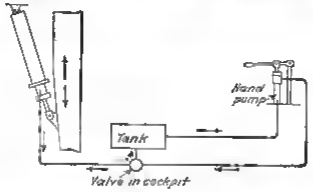
At the end of July, the Great Lakes Aircraft Corp. had on hand orders for 700 Sport-Trainers, enough to keep the plant running full time until the end of the year. In addition, an order has been received from the Navy department for 18 three-purpose bombers, to be delivered about March, 1930. These planes, to be known as "TG-1 type," are substantially the same as the older T4M1 Martin bomber. This order, including floats and spares, amounted to about $700,000.

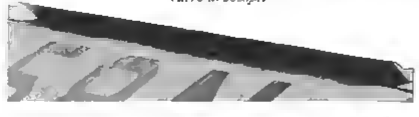
The plant, during the summer, is running two shifts, from 7:30 a.m. to 5 p.m., and from 6 p.m. to 5:30 a.m. The payroll includes 750 men. New men are being added all of the time. An apprentice training course covering three years has been started. Of 350 applicants, 15 were enrolled in the initial class. New classes are to be formed once a year.

At the end of July, production of the training planes had reached four per day. But the rate is being constantly stepped up. The stepping up of production has necessitated the building of two additions, the second being started within a few weeks of completion of the first. The initial addition, covering 10,000 sq.ft. of floor space, is occupied by the stock room and raw materials receiving department. It had hardly been put into use before necessity of adding another 8,000 sq.ft. became apparent. This is to be used for general factory purposes when completed.

Progress OF THE GUGGENHEIM COMPETITION







Above—Photographs showing Schroeder-Wentworth entry with wing in lowered and normal positions. Left—Sketch showing attachment of hydraulic mechanism to "V" strut. Right—Schematic diagram showing operation of hydraulic device. Below—The spoiler in open position

IN our last account of the Guggenheim Safety Competition (Aviation for October 19), we brought the affair up through the reception of four machines and the withdrawal or elimination of three, the Brunner-Winkle having been definitely dropped from the list along with the Alfaro and the Moth, and only the Handley-Page remaining active. Shortly after the middle of October the Gates entry arrived at Mitchel Field, but was removed somewhere after. It too has failed to reappear.

The rules required inflexibly that all machines must be submitted at Mitchel Field by October 31. Entering the last week of October no planes other than those mentioned had been officially presented, although the Curtiss Tanager was known to have been flying regularly, undergoing tuning up trials at a nearby field.

With about four days to go, things began to happen. The Curtiss was flown to Mitchel Field and officially turned over. The Command-Aire, a stock two-seater, arrived by air, as did the Fleet, which was also stock except for the provision of a manually-controlled trailing edge flap on both wings. The Schroeder-Wentworth, which had never yet been in the air, came in by express from the Aerial Mercury plant at Hammondsport, where it had been built to Major Schroeder's specifications.

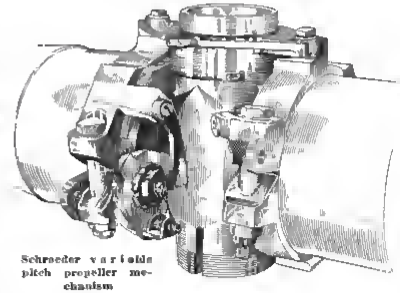
It had been taken for granted that most of the American competitors would arrive by air, and most of them had planned to do so. Just at the critical time, at the end of the month, the weather turned persistently bad, the same rain and fog which held the "Land of the Soviets" immobilized in Detroit keeping several of the competitors on the ground far from Mitchel Field. The Cunningham-Hall machine, built in Rochester, had started by air but had been arrested midway by a broken crankshaft, furnishing an excellent opportunity for demonstrating the landing qualities of the machine. The landing was made without mishap and the machine was hastily disassembled and finished the journey to Long Island in a truck, there to await a new engine or repairs to the damaged one.

The Ford-Leigh Safety Wing entry also came along in the closing days, and proved to be a Brunner-Winkle Bird modified by the permanent addition of a small auxiliary airfoil above the leading edge of the upper wing. The effect is similar to that of a slotted wing, although the auxiliary portion is somewhat larger than in the conventional slot design and is set at a smaller negative angle to the main wing chord than is the section forward of the Handley-Page slot when the slot is open. In the Ford-Leigh machine the auxiliary section is permanently and rigidly mounted, so that the slot between it and the main wing cannot be closed. In one of the early trials a minor failure occurred in the landing gear of this machine in a nearly vertical landing.

October 31 drew to a close with many rumors of planes about to be presented, but there were no actual additional arrivals except the Burnelli twin-engined monoplane, which was formally submitted and then taken away again for a brief period of experiment and adjustment. One competitor who took the announced closing date with proper seriousness sent through a telegram to keep the floodlights on the field switched on and he would land just before midnight, but the weather balked him as it did others. In view of the bad weather, however, the officials decided that any machine would be received which was ready to start by October 31 and of which the owners made an attempt in good faith to be on hand at that time but were prevented from doing so by the weather.

On November 1 the monoplane entered by the Taylor Brothers Aircraft Corporation was flown in, accompanied by another similar machine to act as a tender. The Taylor entry is of substantially standard type, with means of varying the incidence of the wing. The plane entered by J. S. McDonnell, Jr. and associates, of Milwaukee, was reported to be on the way, as was that of the Bourdon Aircraft Corporation. The Rocheville machine was also reported to be en route. Of most of the others nothing was known, and the presumption was that they had eliminated themselves.

Major Schroeder standing before his airplane



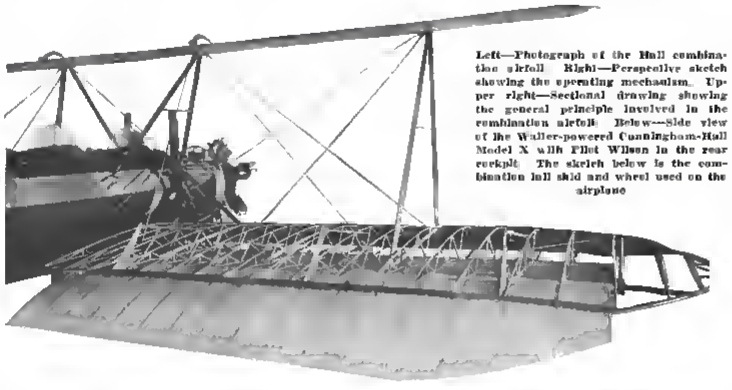
Schroeder variable pitch propeller mechanism

The greatest surprise of the competition has been the non-appearance of the autogiros which had been entered both by the La Cierva Company and by the Pitcairn Autogiro Company as the American licensee. At the time when the rules of the competition were drawn up, a frequently-made comment was that they had been written around the autogiro and that if that type of machine could meet the high speed and take-off requirements it would be assured of victory. It had been taken for granted everywhere, even before formal entry was made, that one or more autogiros would be prominent among the participants. Their failure to reach the starting line, as yet unexplained, has occasioned the greatest astonishment.

Thus, of the 25 entries which were listed a month ago as having been accepted for the Safe Aircraft Competition nine appear to be out of the contest without explanation and without the attempt to submit a plane. Three have been brought to Mitchel Field and withdrawn by the owners either before or after part of the trials had been made, and another has been eliminated for failure to meet the qualifying tests. One also has withdrawn after completing part of the tests.

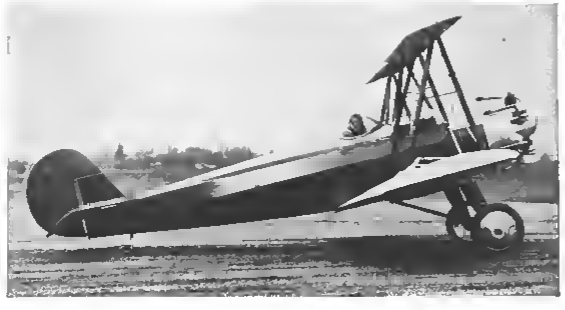
At the time of writing, November 11, no word has been received from the McDonnell or Rocheville entries nor from Autogiros and it is not definitely known whether they still qualify by having been ready on the closing date.

Nine, the Curtiss, Handley-Page, Schroeder-Wentworth, Cunningham-Hall, Fleet, Burnelli, Ford-Leigh, Bourdon, and Taylor, are definitely in the running. Only three of these, the Curtiss, Handley-Page and Fleet, have actually completed tests and unfavorable weather has retarded the progress of these trials



Left—Photograph of the Hall combination airfoil. Right—Perspective sketch showing the operating mechanism. Upper right—Sectional drawing showing the general principle involved in the combination airfoil. Below—Side view of the Waller-powered Cunningham-Hall Model X with Fliet Wilson in the rear cockpit. The sketch below is the combination hull skid and wheel used on the airplane

THE CURTISS TANAGER is an enclosed sesquiplane having tandem seating arrangement and conventional construction. Automatic slots are provided over the entire leading edge of all wings and manually operated flaps constitute the trailing edges, while floating ailerons are installed at the tips of the lower wings. The Curtiss 72 airfoil section is used in both wings



The plane is powered with the 170 hp. Curtiss Challenger engine. It has a wing span of 44 ft and a chord of 5 ft constant throughout the span, providing a wing area of 330 sq ft. The weight of the plane empty is 1900 lb and the useful load 900, giving a geoss weight of 2800 lb.

The outstanding feature of the Tanager is the installation of the new Curtiss ailerons which are said by the designers to provide lateral control in any altitude of flight. These ailerons are of the floating type installed at the tips of the lower wings and operated by a torque shaft running into the wing and parallel to the spars.

The mechanism is so designed that the ailerons can be operated in the usual manner at any setting that they may assume or virtually at any angle of attack of the wing. Their leading edges form a continuation of that of the wing and their chord is somewhat less than the wing chord. The ailerons are provided with dynamic balances on the leading edges.

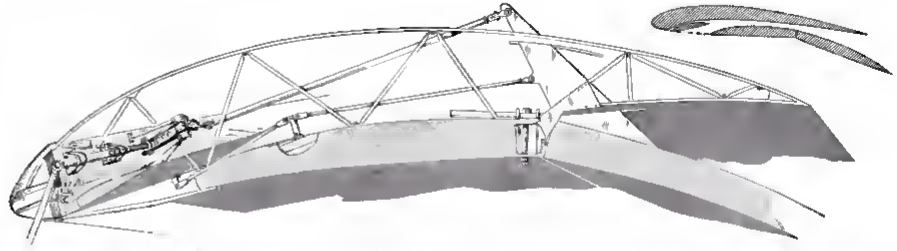
The trailing edge flaps are controlled from the cockpit by a hand crank connected by a chain and sprockets to a torque shaft in the wings. This mechanism is designed in such a manner that there is no load on the control system when the flaps are in either limiting position. This is by virtue of the linkage between the control shaft and the horn attached to the flap. The horn is so placed that when the flaps are in their uppermost position the horn is completely out of the air stream.

As in the case of most of the Guggenheim entries, the Tanager has a normal tail with the only unusual feature being an unusually large stabilizer travel

Oleo tail skid and landing gear shock absorbers are

provided and have approximately double the travel normally employed on Curtiss planes of this general type and weight. The wheels may be drawn up 2 in. while the plane is on the ground and in flight and released by a very simple trip device in the cockpit before landing the airplane

THE CUNNINGHAM-HALL MODEL X is an open tandem cockpit plane and embodies an airfoil designed by Randolph F. and T. P. Hall several years ago and first described in the February 15th and April 26th, 1926 issues of AVIATION. The airplane, which is powered with the five cylinder Walter radial engine, has the general appearance of a biplane having wings of nearly equal span and constant chord but with upper wing chord considerably less than that of the lower. In order to avoid possible blanketing of the tail surfaces by the downwash from the flaps the variable lift feature is incorporated in the lower wing which has a chord of 72 in., while that of the upper wing is but 24 in. The aileron action is entirely on the upper wing and the area of the ailerons which constitute the entire trailing edge is approximately one-half that of the entire wing. In



addition to providing mounting for the ailerons the upper wing also contributes to the rigidity of the cellule

The variable lift feature of this airplane is known as the Hall convertible monoplane-biplane wing. It might be considered as a thick section convertible into two superimposed thin sections to produce in effect a positively staggered biplane of very small gap-chord ratio. The closed position is of course for high speed flight

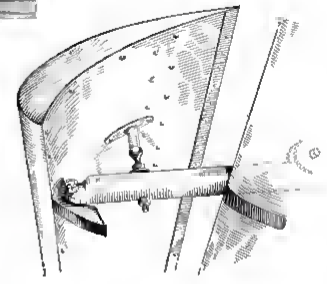
Right—Photograph of the Curtiss Tanager showing the floating aileron and trailing edge flaps. Below—Sketch showing construction and mechanism of slots on the leading edges

while the open condition is for landing. Considering the airfoil in closed or thick section condition, a vane or pivoted flap is provided in the lower surface near the leading edge and, when opened, affords entrance to the gap between the thin sections. In this condition air flows through the interior of the wing. The rear flap is pivoted to the rear spar and, in lowered position, affords exit for the air passing through the front vane and wing structure. These movable surfaces are operated simultaneously to open or close the gap between the thin sections. Forward vane and rear flap are interconnected, the flap being controlled manually by a hand wheel and screw mechanism while the forward vane is linked to the flap to produce simultaneous operation. Automatic operation of the variable lift device is the ultimate aim of the designers. Ailerons on the upper wing are actuated by struts attached to bell cranks mounted on the lower wing rear flap. The travel of the flaps produces a change of setting of approximately 9 deg. in the aileron

Two hundred and three sq ft of wing area are provided in this airplane, of which 50 constitute the upper surface and 153 the lower when it is in closed position. The travel of the rear flap is approximately 30 deg. and that of the upper is about 9 deg. The gap between upper and lower wings is 66 in. A Clark Y airfoil is used on the base while the upper wing employs an M6

It is stated by the designers that the center of pressure travel of the lower wing section is virtually the same when used in either high or low lift conditions. It is also planned to install spoilers on the upper wing so linked as to be operated by the last few degrees of aileron travel.

The structure is of steel and aluminum alloy tubing throughout and fabricated by welding and riveting. The upper wing may be considered as of single spar construction with a 2¾ in. x .065 chrome molybdenum steel tube drill with lightening holes constituting the spar. The leading edge is an aluminum alloy tube of considerably smaller diameter than the spar and ribs are aluminum alloy stampings. Welded steel ailerons of



the balanced type and similar to those used on the PT-6 cabin biplane, also manufactured by the Cunningham-Hall Company, are used

A combination wheel and skid of unique design is used and 6 in. travel is provided by the rubber chord shock absorber. Landing gear shock absorbers are of the Gruss type having 9½ in. travel and brakes are of standard design. A N.A.C.A. cowling of conventional type is provided for the engine.

The span of the upper wing is 30 ft and that of the lower 26 ft., while the overall length is 22 ft. The

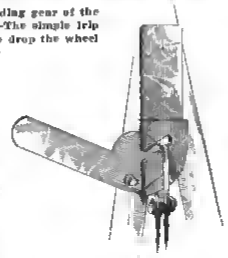
weight empty is 1200 lb. and the useful load 450 lb. The airplane has a gasoline capacity of 21 gal.

THE SCHROEDER-WENTWORTH is a closed semi-cantilever monoplane designed by Major R. W. Schroeder and built at the Mercury Aerial Service plant at Hammondsport, N. Y. under the technical direction of Harvey Mummert. It is powered with a Comet engine rated at 130 h.p. at 1800 r.p.m. The outstanding feature of this airplane is the variable camber wing which is built in three sections having dividing lines parallel to the span. The forward section of the wing is fixed by the external bracing and the two rear sections movable, control being effected by a V strut attached to the rearward edge of the second section and having its apex within the fuselage. This V strut is raised and lowered by a hydraulic mechanism in the present model, but it is planned to control it automatically in future modifications of the design. The third or trailing edge section of the wing, which is composed entirely of flaps and ailerons, is linked to the central section so that it moves in conjunction with it. The central section has an angular travel of 16 deg. and the rear section 40 deg. in addition, making a total inclination of the rear section to the front of 56 deg. in the low speed position. The aileron portions of the rear section have differential motion, downward travel being very slight in comparison with the upward. The 480 sq.ft. of area is so distributed that 30 per cent constitutes the front section, 40 per cent the central section and the remaining 30 per cent the rear section. The ailerons are 15 ft. 6 in. in span. A slightly modified M6 airfoil section is used. Spoilers are installed and operate by cam mechanism acting in conjunction with the aileron control. The wing structure is built of welded steel tubing and is covered with fabric.

The oil cylinder used to actuate the flap mechanism is of the double acting type with a bypass for the oil. The bypass is provided so that the Oleo mechanism will act as a dash pot to retard the motion when the mechanism is operated automatically by center of pressure travel. In hydraulic operation the loads on the operating mechanism are taken by a shock chord.

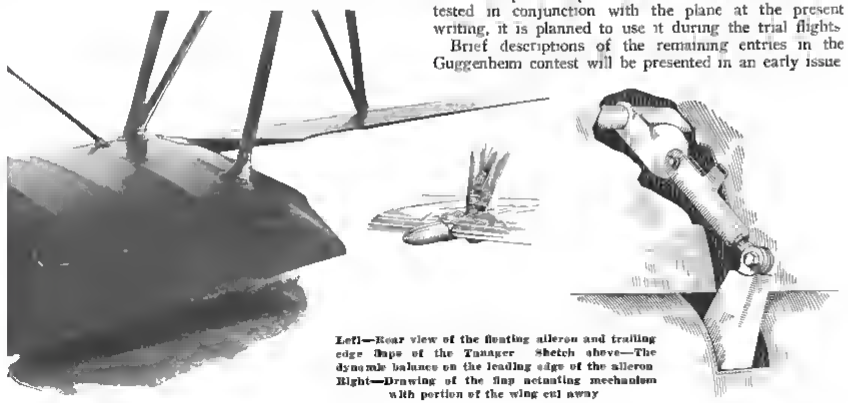
The Schroeder-Wentworth airplane has a wing span of 57 ft. and a mean chord of 9 ft. The overall length is 28 ft., the weight of the plane empty is 1 850 lb. and the useful load 650 lb.

Above—Closeup of the landing gear of the Curtiss Tanager. Below—The simple trip device enabling the pilot to drop the wheel for landing



Another interesting development is the Schroeder variable pitch propeller which is to be used on the Schroeder-Wentworth plane. This propeller is controlled automatically by center of pressure travel and centrifugal force on the propeller blade and provision is made for two settings having a six degree variation in the present model. A ratchet mechanism holds one blade in either of the two positions while a linkage between the blades produces equal changes of pitch in both. The entire mechanism is actuated by the propeller blades themselves when the engine is throttled down or speeded up. While this device has not been tested in conjunction with the plane at the present writing, it is planned to use it during the trial flights.

Brief descriptions of the remaining entries in the Guggenheim contest will be presented in an early issue.



Left—Rear view of the floating aileron and trailing edge flaps of the Tanager. Sketch above—The dynamic balance on the leading edge of the aileron. Right—Drawing of the flap actuating mechanism with portion of the wing cut away

AIRWAY *Radio* PROGRESS

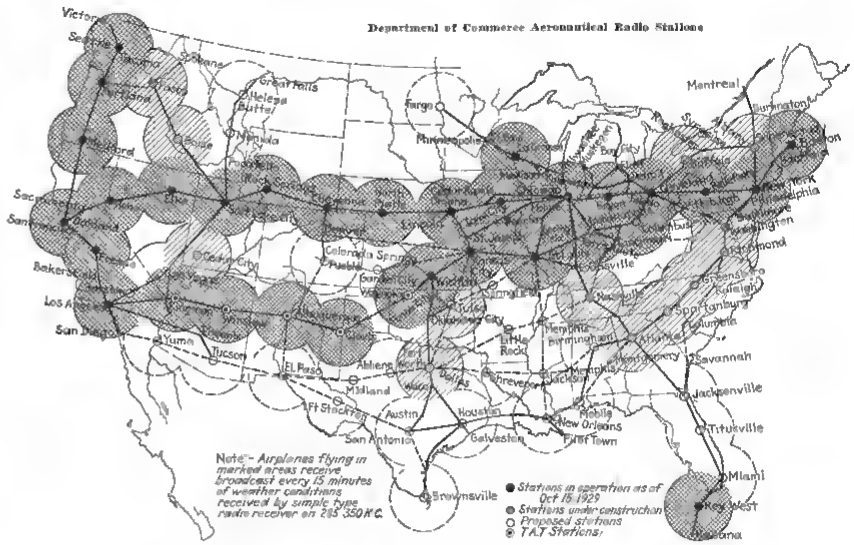
Twenty Four Weather Stations and Eight Rural Beacon Stations Now Rendering Service to Transport Lines

By MARTIN CODEL

WORK IS PROGRESSING apace on the aeronautical radio system projected along the civil airways by the Airways Division of the Department of Commerce. Transport lines now flying the routes on regular schedules are daily taking advantage of the vast weather reporting and radio-beacon network already in operation, although they have recently projected a supplementary system of their own to furnish radio services where the government cannot. Even the itinerant pilot, if his craft is equipped with a simple radio receiver, can now take advantage of the fast-expanding airways radio system, which the government expects to have in full operation some time next spring.

Weather transmission schedules from the 24 stations transmitting sector weather information prepared by the Weather Bureau have just been increased from half hour to 15-minute intervals. Fifteen more such stations are under construction. When they are completed, there will be hardly a square mile in the United States not covered by the radio broadcasting of weather information, according to Capt. F. C. Hingsburg, chief of the Airways Division.

There has been somewhat of a letup in the construction of radio-beacon stations, eight of which are now in operation from Boston to Hadley Field and thence along the Transcontinental Airways to Des Moines. This has been partially due to great expectations from the visual beacon, which it was hoped might render the aural beacon obsolete and make it more desirable to install visual beacon transmitters solely. The several beacon stations now



in operation are all of the aural type certain characteristic breaks in the continuous stream of long dashes telling the pilot flying the beacon course whether or not he is straying away from it

IT HAS NOW virtually been decided to proceed with the construction of the remaining aural beacon stations and about 35 of them will be completed by next April or May The visual beacon with its reed indicator needs more experimentation, and the seven visual stations now under construction at the laboratories of the U S Lighthouse Service at Detroit will be installed at key points to further these experiments They were originally destined for the New York-Atlanta route but aural beacons will be installed instead, largely, it is understood because of the insistence of the Pitcairn Company which flies that route with the air mail

The two systems, weather broadcasts and radio-beacon transmissions, complement each other Both of course are intended to increase the safety of flight Capt Hingsburg is authority for the statement that the National Air Transport which flies the mail along the Transcontinental to Chicago, claims a 30 per cent increase in performance efficiency due to the aural beacon

While airways lights now spaced 10 miles apart along the route with lighted intermediate fields at 30-mile spacings, are excellent guides under conditions of good visibility, the radio-beacon is not affected by weather or visibility Radio direction signals will hold the pilot to his course in the thickest fog If he drifts off his course, he loses the signal from the ground station, hears the dot-dash or dash-dot characteristic of the beacon and pulls back to his course Long waves, i e , the 285-350 kilocycle band, are used for the radio range beacon

In the same band of wave lengths the weather reporting service operates, so that the same receiver that tunes in the beacon signals will bring in vocal descriptions of weather and landing conditions ahead at 15-min intervals There are of course more actual broadcasting stations in operation today than there are radio-beacon stations for the development of the former began long before the beacon was perfected

The ground stations of the beacon system do not project their signals in only one direction, but, as at Boston, mark four-way courses At Hadley, for example, the station not only marks the directional course to Bellefonte but also a course to Washington

The antenna system of the radio-beacon station consists of two directional loops supported on a pole The transmitter sends out a characteristic signal from equivalent loops alternately in a character that interlocks, marking the radio course by interlocking dashes There are four courses, each approximately 3 deg in width, ranging from the radio-beacon These can be shifted by means of the geniometer to coincide with the lighted airway The receiver on the plane has earphones fitted in his helmet so that he can hear the signals

Two of Transcontinental Air Transport's radio broadcasting stations, the one at Columbus and the one at Indianapolis, will probably be taken over by the Airways Division of the Department of Commerce on Dec 1 and included in the general setup projected by the government

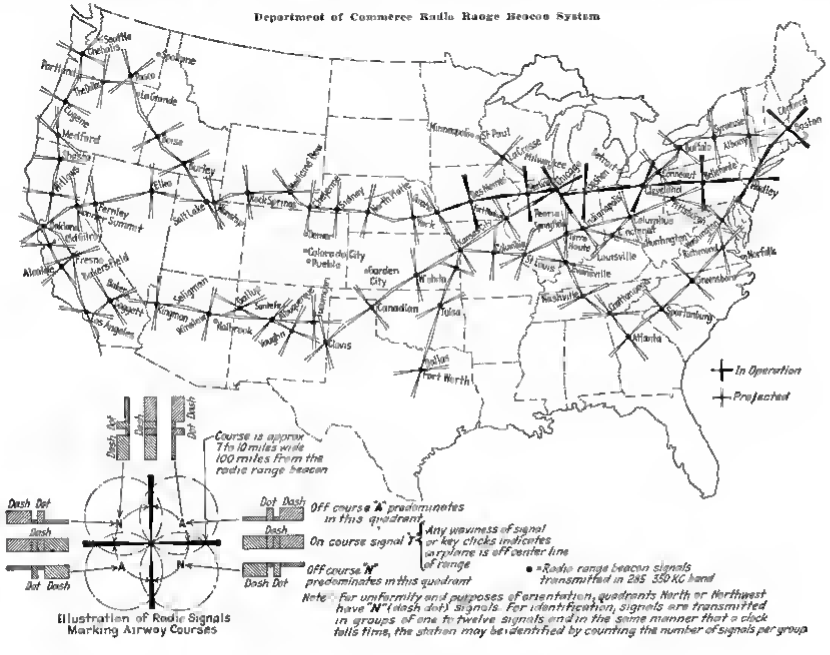


Illustration of Radio Signals Marking Airway Courses

AIRCRAFT AND THE *Thunderstorm*

By W. J. HUMPHREYS
United States Weather Bureau

WHEN WE TRY our best to make it clear that a certain man is a hopeless fool, we say "He hasn't sense enough to come in out of a thunderstorm" Similarly, and with much greater justification, we might express our opinion that a particular pilot is lacking in grey matter by saying the "he hasn't sense enough to keep away from a thunderstorm"

There are two things that make a thunderstorm dangerous to aircraft of every kind, lightning and wind, and of these the wind is by far the worst—lightning probably will not hit the craft, wind certainly will We hear most about, and people fear most, the lesser of these two evils, lightning, because it is spectacular and the bearer, when it strikes full and direct, of instant death You are, and then, without warning of sight, sound or other sense, you are not Lightning, therefore, is greatly dreaded by many people, and yet if we had no other way of shuffling off this mortal coil, and had to await our proper turn, we would be 200 times as old as Methuselah before we ever got a chance to play a golden harp or wear a golden crown This is for people as ordinarily occupied The man in the air would not have to wait so long He would be more favored and his time reduced a hundredfold

IT COMES ABOUT this way Only one streak of lightning in a hundred, roughly—perhaps several hundred—reaches the earth, but every one, without exception, passes through the air at cloud level Hence an airplane for instance, within or near the base of a thunderstorm cloud is far more likely to be in the direct path of lightning than it would be if on the ground. The discharge would not be from cloud to plane and nothing more, nor from earth to plane, but *by way* of the plane, and but a little more often than it would have passed at that particular time and place (the place occupied by the machine, by an enveloping shell a few feet thick about it and by 50 to 100 ft, roughly, of the exhaust trail) if the plane had not been there A short stretch of the exhaust is included because as it leaves the engine, and for a fraction of a second thereafter, it is more highly ionized and therefore a better conductor, than is the air The shell about the plane, or, more exactly, about the large metal parts, is included because a conductor (all metals are conductors) in a field or region of electric force, such as exists between a charged cloud and the earth, so changes the direction of that force in its (the conductor's) immediate neighborhood as to deflect to itself discharges that otherwise would have missed it by possibly half its diameter The amount of this deflection depends on the shape of the conductor as well as its size A large all-metal airplance might be hit by lightning that would have missed by perhaps 5 to 10 ft a plane of the same size and shape that had no metal about it Hence there is lightning hazard within a thunderstorm cloud and to a distance of fully a mile from it, at least on the front side It may not be great, the odds against being struck may be 100 to 1 or 1,000 to 1, but even so they are too great to be taken when they so easily can be avoided—by staying out of the storm

IF ONE ACTUALLY is in the midst of lightning he is safer in an all metal plane or one that has passengers and vital parts surrounded by metal, than in any other kind This is because lightning, if it hit at all, would hit the outer metal cover and be carried away by it without injury to persons or things inside, whereas a non-conductor, if hit, would be more or less shattered. However metals are fused at every place lightning enters or leaves Hence the gasoline tank should be enclosed in metal to avoid the risk of having holes burned into it if one would be doubly safe against lightning Furthermore, all wires of importance, structural and control, should be enclosed within the metal shells of wing and fuselage [Zeppelin airships have several times been struck, with local fusing of the girders but without other damage —Ed]

But, as already stated, the winds of the thunderstorm are more dangerous than its lightning Often they are exceedingly violent—no mere zephyr can sustain a hailstone as big as a base ball, and such stones do occur In a severe thunderstorm the winds are up, down, crosswise and rotating, and no aircraft ever constructed can enter them with impunity Keep away from unnecessary danger, do not go canoeing in the rapids above Niagara Falls and for a like good reason do not try to buck through the heart of a severe thunderstorm

The isolated or heat thunderstorm is easily shunned It can be seen from afar, seldom travels rapidly, and, because it is isolated, there is little danger in going around it, of unwittingly running into another The thunderstorm of the cold front, squall line, or wind-shift line, as we may choose to call it, is quite a different thing It commonly is but one of several to many, in a line hundreds of miles long that travels abreast across the country 20 to 30 m p h and along which other storms may quickly develop at any time To dodge the squall line thunderstorms one should fly high between storms far apart, and of course at right angles to the line connecting them, that is, across the wind-shift line as it is shown, or generally can be shown, on the current weather map

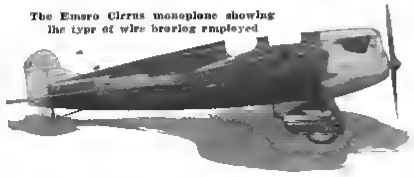
Keep out of the thunderstorm By so doing the pilot will avoid the relatively small yet distinctly real danger of lightning, and also the very great danger of the severe and turbulent winds and thereby protect his passengers, his cargo and his plane from one of the greatest hazards known to aviation

RECENT *Airplane* AND *Engine* DEVELOPMENTS

Emsco Cirrus MONOPLANE

SUCCESSFUL test flights of the Emsco center wing, two place, training monoplane powered with a 95 hp American Cirrus engine and which was exhibited at the recent Cleveland Aeronautical Exposition, were held recently at the Long Beach Municipal Airport, Long Beach, Calif.

Weighing 1090 lb. empty and 1640 lb. loaded, the Emsco Trainer has a span of 36 ft., total wing area of approximately 200 sq. ft., height of approximately 7 ft. and overall length of 21 ft. 10 in. Wings are mounted to the fuselage just above the line of thrust, have a dihedral



The Emsco Cirrus monoplane showing the type of wire bracing employed

angle of three degrees and are braced top and bottom with MacWhyte streamline wires to tripod structures which are enclosed within the fuselage fairing. The wire type of bracing eliminates external struts. Beneath the fuselage the tripod structure to which the flying wires and landing gear struts are attached is completely enclosed in a finlike dural fairing. The wheels are almost completely enclosed in streamlined hoods which add to both the efficiency and appearance.

Wings of the Emsco Trainer are built in two panels of rectangular plan form with neatly faired wing tips. Spars are of box type with internal spacers of spruce arranged in the form of a Warren truss and three ply plates nailed and glued on each side. There are five bays of single wire drag bracing in each wing panel with steel tube compression members. A modified Gottingen 398 airfoil section is used with spruce and plywood ribs reinforced over the leading edge with duralumin sheeting. Covering is of Grade A fabric with four coats of Fuller's clear dope and two of pigmented brushed on. Frise type ailerons are set in a short distance from the wing tips, being mounted on steel tube outriggers from the rear wing spar, and are controlled by cables running over Micarta pulleys to horns. Wing panels are attached to the fuselage in rigid fittings which bridge over each cockpit and are braced top and bottom by double MacWhyte streamline wires. Inspection windows are provided at control pulleys.

The fuselage is of conventional welded chrome molybdenum steel structure and is well braced around the cockpits where tripod structures top and bottom carry flying and landing wires. Visibility from the front cockpit of the plane is unusually good while that from the rear cockpit has been improved by placing large windows in the fairings along the under side of the wing root fairing. Seats are of dural and are built to accommodate parachutes. Controls are of standard stick and rudder bar type with wire cables to all control surfaces. A consolidated type A panel is mounted in an aluminum instrument board which carries a fuel gauge and air speed indicator in addition to the tachometer, altimeter, oil temperature gauge, and oil pressure gauge of the panel.

Since the Emsco plane is built for no other engine than the Mark IIf Cirrus the mounting is not detachable. Cowling around the engine may be removed quickly, however, and if necessary the entire engine can be dismounted in 15 or 20 min. Exhaust gas is carried away through a nickeled steel manifold running alongside the fuselage above the wing, to in rear of the rear cockpit. An aluminum fire wall of heavy gauge is built into the fuselage in rear of the engine. Fuel is carried in two 15 gallon tanks of terne plate steel carried within each wing root.

Empennage surfaces are of welded chrome molybdenum steel tubing, fabric covered. The horizontal stabilizer is of divided type adjustable during flight at the leading edge and braced at the trailing edge by streamline steel tube struts to the lower fuselage longerons and streamline wires to the fin. The fin is adjustable on the ground only. Elevators are unbalanced and independently mounted but are each positively operated from a single torque tube within the fuselage by means of push-pull tubes to elevator horns. The rudder is of balanced type and is wire and horn operated. Rudder and elevators are carried in Micarta journals which require no lubrication.

With a tread of six ft. the divided axle landing gear has a clearance between the ground and central fin of two feet. Axles and drag struts run to fittings on the same tripod structures which carry the flying wires from the wing. Streamline wires brace this tripod each way to the fuselage to protect against side landing strains. Shock struts carrying Aerol shock units extend up to the forward wing spar fitting on the fuselage, the shock absorber unit being completely enclosed in the wing root fairing. A tripod tail skid is equipped with a vertical shock strut which carries landing shocks to the tail post through compression rubber discs.

Specifications as supplied by the manufacturer are:

Length overall	21 ft. 10 in.
Height	7 ft. (approx.)
Span	36 ft.
Chord	6 ft.
Dihedral	3 deg.
Incidence and sweepback	0
Wing area	200 sq. ft. (approx.)
Stabilizer area	15.5 sq. ft.
Elevator area	8 sq. ft.
Rudder area	4.47 sq. ft.
Fin area	1.13 sq. ft.
Weight of plane empty	1090 lb.
Useful load	550 lb.
Gross weight	1640 lb.
Powerplant	American Cirrus Mark III 95 hp.

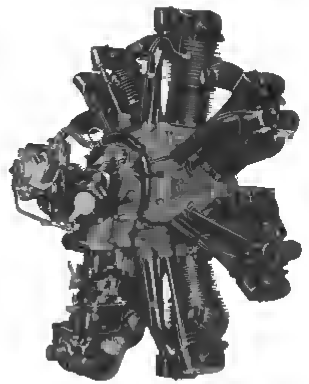
Axelson TYPE "B" ENGINE

INCORPORATING many refinements not found in the original Type "A" engine, the Axelson Type "B" seven cylinder, air cooled, radial engine is in production at Los Angeles following its first showing at the recent Cleveland Aeronautical Exposition. The Type "B" engine is manufactured under the same Type Certificate No. 16 as was granted the original Type "A" by the U. S. Department of Commerce, satisfactory test runs of the new product having been made on the Department of Commerce test stand and also in flight tests made with three different types of aircraft. The engine is rated at 150 hp., and has a displacement of 612.3 cu.in. and a weight of 420 lb.

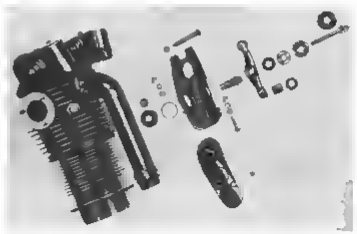
Outstanding among the many improvements are changes in the crankcase, cylinders, and valve mechanism. Whereas the original engine had a four-piece crankcase, the new case has been reduced to three sections of simplified design, lighter in weight, and stronger. The front section contains the front main bearing and ball thrust bearing with an integral breather passage cast in the case. The joint between front and center sections is made along the center line of the cylinder and the two sections are held together by seven large bolts. The center section carries the rear main bearing, cam and accessory drive mechanism, valve tappets, and an integral oil sump, while the rear section bolted to the middle only contains ducts and chambers for the distribution of fuel to the cylinders, and the magneto drive housing. Main bearings are of an improved type employing steel backed bronze bearings, and are larger than previously. The divided crank shaft and one-piece connecting rod spool are retained in the new engine. Pistons are lighter in weight with longer skirt and larger wrist pins and five rings are used.

Lessened air resistance and improved cooling have resulted from a complete redesign of the cylinder head and cooling fins. Fins on the steel barrel are now machined from a solid forging instead of being pressed in place as before. The cylinder head, of aluminum alloy, is screwed and shrunk to the steel barrel, a much neater head having resulted from moving the intake port to the rear and between the two valves. This position also reduces the length of the intake manifold and simplifies its form. Exhaust ports located on the left side of the cylinder head are equipped with cast aluminum alloy finned exhaust boxes to which the manifold connections are made. Spark plugs are mounted diametrically opposite each other but are better located in the cylinder head for cooling from the intake gases. A bronze bushing is provided which permits mounting any standard plug. A cylinder plug is also provided for the attachment of any standard injection starter fittings if desired.

Improvements also have been made in the valve mechanism. Smoother rocker boxes serve to decrease resistance due to frontal area and at the same time retain the compensating feature of the original engine in an improved form. Greater accuracy and serviceability



Above—Rear quarter view of the Axelson Type B radial engine. Lower left—Rear view of the central crankcase section showing the use of the single lever cam and the elimination of cam followers. Lower center—The assembled cylinder and disassembled rocker box and mechanism. Lower right—The crankcase assembly of the engine



of the compensating mechanism has been obtained by the use of a large hinge bearing for mounting the front of the rocker box to the cylinder head, instead of the stud and spring formerly employed Two positive guides are mounted at the side of each rocker box while an oil tight joint attaches the rear of the rocker box to the upper end of the push rod housing This compensating mechanism maintains the same valve tappet clearance over all ranges of engine temperature and it is possible to set valve clearances with the engine either hot or cold Ball bearings are now used on the rocker arms and an improved method of pivoting the rocker arm roller has been adopted.

Tulip valves of the same type as used in the Type "A" engine are used on the new model but valve lift has been increased from $\frac{1}{2}$ in to $\frac{9}{16}$ in and diameter of the intake valve stem has been reduced $\frac{1}{16}$ in while that of the exhaust valve stem has been increased $\frac{1}{16}$ in. Valve guides have also been improved, the intake guide being of special bronze and the exhaust guide of high-speed steel, both guides being pressed and shrunk into place.

A single track cam is used in the new series engine in place of the double track cam previously incorporated, and the valve tappets are provided with rollers which ride directly on the cam instead of using an intermediate cam follower as before This simplification of cam and tappet mechanisms has materially lowered the weight and served to make the engine more reliable

Miscellaneous modifications include the new oil sump cast integral with the center case section, the practice of eliminating all external oil lines by boring oil passages in the case itself, there being but one external line and that one very short, in the new engine, and the oil cooler and intake heater which is cast into the intake manifold just above the carburetor attachment Other minor changes are found in the provision of S A E flange mounting for any standard aviation engine starter, and S A E standard fuel pump mount with an accessory drive operating at $\frac{1}{2}$ crankshaft speed for the operation of an engine driven fuel pump. There are, in addition, a number of other details that have been modified

Although some 30 lb lighter than the former engine the new Axelson Type "B" is credited with approximately 20 hp more than formerly The compression ratio, has been increased from 4 7 to 5

Production of the Type "B" will be continued in the main plant of the Axelson Machine Co until the completion of the new Aircraft Division factory some time in November.

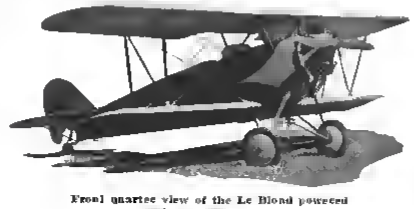
Specifications as furnished to AVIATION by the manufacturer:

Model	Axelson Type "B" seven cylinder radial
Rating	150 h.p. at 1,800 r.p.m.
Bore	4 5 in
Stroke	5 5 in.
Displacement	612.3 cu in.
Comp. ratio	5:1
Overall dia	45 in.
Overall length	37¾ in
Dry weight	420 lb without hub or starter
Shipping weight	800 lb.
Fuel Consump	0 55 lb per hp hr
Oil Consump	0 017 lb per hp. hr
Ignition	Two Scintilla MN7-DF
Carburetion	One Stromberg NA-R5.
Lubrication	Duplex gear pump

Fleetcraft BIPLANE

PLANS are now being made for production of the fleetcraft "Model A," a two-place sport biplane This airplane has been brought out by the Fleetcraft Airplane Corporation, Lincoln, Neb It is an open cockpit biplane of conventional construction having two places side by side seating arrangement, and powered with the Le Blond Sixty Model 5D engine

The fleetcraft Model A has a wing span of 27 ft 6 in, and a lower wing span of 24 ft. The upper wing cord is 53 in, while that of the lower wing is 47½ in maximum Fuselage construction is of the usual Warren truss type, employing welded steel tubing, and landing gear is of the split axle type The wings are built in four panels and a center section supported by "N" type struts is employed "N" struts also are employed in the interplane bracing Swedged landing and flying wires are also used in the external bracing A 22 gal. tank for gasoline is built into the center section Ailerons are built into the lower wing.



Front quarter view of the Le Blond powered Fleetcraft biplane

The plane has a weight, empty, of 847 lb, and a gross weight of 1350 lb

Roamair BIPLANES

IN RESPONSE to the demand for two place sport and training planes, the RoamAIRcraft Corporation of Los Angeles has developed a series of biplanes known as the Cadet, Sport, and De Luxe Sport These planes are all built around the same structure, varying only in power plant, finish, and equipment Engines used vary from the LeBlond 90 to the Kinner, Warner, and 165 hp Wright J-6 The first plane tested was a Warner powered sport

Of the single bay biplane type, with upper and lower wing spans equal, the RoamAIR weighs 1,060 lb empty and measures 21 ft 6 in in overall length, 8 ft 6 in high, and 30 ft. 1 in. span. The gap is 56 in and stagger 10½ in, while total wing area is 234 sq ft. With an exceptionally well faired fuselage the RoamAIR is neatly finished in raven black on the fuselage, struts, fin and rudder, with oriole red wings, stabilizer, flippers and wheels

Stability and maneuverability have been found in excess of all Department of Commerce flight requirements

Refinements of the De Luxe Sport include Navigation lights, Bendix wheels and brakes, tail wheel equipped with Hyatt bearings and Goodrich pneumatic tires;

Standard Steel propeller, Arens engine controls, tool, map, and baggage compartments, a specially developed oversize air and oil shock strut unit, quick removable control unit, built up continuous steel tube hinge pin with bronze rod bearing surfaces for elevators and rudder, and positive stops on all controls Many of these features are also included in the Cadet and Standard Sport models

The Roamair sport and training plane

Wings are built in four panels, the lower wings being pinned to fittings on tie tubes welded across the fuselage structure, while the upper panels are joined to the center section All spars are of built up box type, with laminated cap strips in the upper wing spars Fitting blocks in the spars are laminated of mahogany and plywood against shear, side plates being of ¼ in three ply veneer with compression spacers at each point of rib attachment There are three bays of drag bracing in each wing panel with single steel tube compression members Detachable wing tip fairings are of welded steel tube construction Spruce truss ribs are spaced at 14 in with plywood leading edge, and V dural strip trailing edge with eyelets for draining interior of wing Covering is with Triple A Flightex finished with six coats of dope furnished by the R N Nason Company, of San Francisco. Five coats of clear and two of pigmented dope are applied, with the first two coats brushed on, then five spray coats Airfoil section of both upper and lower wings is the Gottingen 398. Frise type ailerons are set in one rib from the wing tip and are controlled by torque tubes extending into the pilot's cockpit

The rigid truss fuselage is welded up from chrome molybdenum steel tubing, a feature being that the structure is built in fore and aft sections which are then joined All fittings are of 1025 steel In factory production it is planned to dip all metal structures in a Lionoil vat for internal protection of the tubing External protection is by a metallic primer manufactured by the R N Nason Company Covering and doping of the fuselage is similar to the treatment given the wing Fairing is by spruce strips over plywood bulkheads which are permanently attached to the steel tube structure Center section drag struts are extended forward to leave the front cockpit unobstructed, and are adjustable Interplane "N" struts are also adjustable, all external struts being of streamline steel tubing Flying wires extend from fittings at the point of strut attachment to each upper wing spar down to a single fitting at the fuselage on the forward lower wing spar, while landing wires extend up from a single fitting at the point of strut attachment to the forward lower wing spar to fittings on each upper wing spar at the point of center section strut attachment All wires are of MacWhyte manufacture

Both cockpits are finished in Chase Pigskin on the De Luxe Sport and with Chase Buckmore Antique on other models Aluminum bucket seats for parachute packs are normally fitted with spring seat cushions and there is a large tool compartment under the front seat of all models A map compartment is carried in the fuselage directly in rear of the after cockpit and a large baggage compartment opening on the left side, is provided, all compartments being fitted with locks Controls are mounted in a unit beneath the floor which is bolted directly to the fuselage and may be removed intact by taking off an aluminum pan on the underside of the fuselage and loosening six bolts.

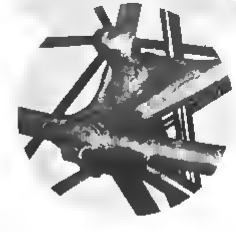
Ailerons are operated by torque tubes, elevators by push and pull steel tubes, and rudder by wire cables to horns. The stabilizer may be adjusted to any position by a worm gear device operated through a torque tube by a large hand knob in the rear cockpit Heavy bracing is built in around each cockpit as a protection in case of crash and crash pads are built into the instrument boards

Instruments are mounted on an aluminum board grained and painted to resemble mahogany Pioneer compass, altimeter, tachometer, oil pressure and temperature gages, clock, and engine switches are standard with air speed and bank and turn indicators and navigation lights optional

Detachable engine mount is standard on all models, with Arens engine controls Firewall is of steel terne plate A five gallon oil tank is carried in the trainer and an eight gallon tank in the sport models, all tanks being equipped with a special strainer outlet which insures the flow of oil to the engine so long as there is any in the tank. Gasoline is supplied from a 26 gallon tank mounted in the center section with an auxiliary 12 gallon tank in the fuselage at the first bay All tanks are of Armco steel terne plate with visible reading gasoline and oil gages installed to give a direct reading at the instrument board of the supply in the main oil and fuel tanks Annealed copper tubing is used for oil and fuel lines except at points of unsupport where Tite-Flex metal tubing is employed

All empennage members are of welded steel tube construction with the stabilizer wire braced from the trailing edge to the fin and fuselage Rudder and flippers are of unbalanced type The fin is adjustable on the ground, while the stabilizer, as previously described, is adjustable in flight at the leading edge by means of a worm

Fuselage structure of the Roamair two place biplane



Close up of the front lower wing spar fitting showing the lockpend end tie tube extending across the fuselage

gear mechamsm A duralumin tail wheel is slung beneath the rudder and in rear of the stern post to which it is pivoted Shocks are absorbed by compression rubber disks in a column extending to the upper portion of the tail post The wheel is equipped with Hyatt roller bearing and a 10x3 in pneumatic tire

The landing gear is of wide tread and is equipped with Bendix wheels and brakes and 28x4 in Goodrich tires Axle and drag strut extend to fittings on each lower longeron, while the shock strut extends up to the forward center section strut fitting on each upper longeron A large air and oil shock absorbing unit developed and patented by the RoamA1Rcraft company is incorporated in this strut The cylinder in this unit is 4¾ in inside diameter and carries a pressure of 70 lb above the piston and 35 lb below the piston when the plane is on the geound These pressures equalize in the air, of course, but serve to give a very smooth run when the plane is taxiing

Five planes have already been completed by the RoamA1Rcraft company in its temporary factory and a special factory building will be erected during August and September to provide a capacity production of 20 planes per month It is planned to start the production schedule at 10 planes a month for the present, specializing on the trainer

Special jigs and methods have been worked out to make the RoamAIR a more dependably built airplane with little attention being given to methods for cheapening costs of production The RoamA1Rcraft Corporation plans quality production only and will make every effort to introduce desirable refinements and improvements in production

Officers of the company include Nicholas Christensen, president and treasurer; L C Armstrong, vice-president and general manager; George A Hunter, secretary, Earl Ovington, designer, William J Waterhouse, consulting engineer, and Carl Spangenberger, factory superintendent

Specifications and performance figures on Warner powered Sport as supplied to AVIATION by the manufacturer are

Length overall	21 ft 6 in
Height overall	8 ft 6 in
Wing span, top and bottom	30 ft 1 in
Chord, top and bottom	51 in
Gap	56 in
Stagger	10½ in
Wing area	234 sq ft
Aileron area, effective	19 5 sq ft
Stabilizer area	12 sq ft
Elevator area	12 sq ft
Fin area	3 ft 3 in
Rudder area	5 ft 5 in
Angle of incidence	0, both wings
Dihedral angle, upper wing	½ deg
Dihedral angle, lower wing	1½ deg
Weight of plane empty	1 060 lb
Disposable load	590 lb
Gross weight loaded	1 650 lb
Power plant	Warner 110 hp at 1 800 r p m
(LeBlond, Kinner, or Wright 150 may be fitted)	
Wing loading	7 05 per sq ft
Power loading	15 lb per hp
Propeller	Standard Steel (Wood on Cadet)
Gasoline capacity	38 gal
Gasoline capacity (De Luxe models)	76 gal
Endurance at cruising speed	4 hr
Range of cruising speed	360 mi.

Eyerly MONOPLANE

AFTER more than 400 hr of flight testing the Eyerly three place cabin monoplane is to be placed in production by the Eyerly Aircraft Corp, Salem, Oregon This plane carries two passengers in an enclosed cabin with the pilot in an open cockpit at the rear The semi-cantilever wing is mounted above the fuselage with approximately four inches clearance

The Siemens Halske powered Eyerly monoplane

between wing and cabin roof There are two wing fittings above the cabin and two wing struts on each side which extend to a common fitting on each lower fuselage longeron

With an overall length of 22 ft 1 in, height of 7 ft, and wing span of 34 ft 6 in, the plane has a total weight empty of but 1,000 lb Chord of the wing is 5 ft. 6 in and total wing area 190 sq ft Flight tests were made with a 97 hp Siemens Halske engine but production models will be powered with the Kinner or Warner engine

Construction of the Eyerly plane is conventional, with wood wing and steel tube fuselage covered with fabric and doped Finish is with aluminum pigmented dope. A split axle landing gear with a rubber shock cord absorber unit mounted beneath the cabin is regular equipment with a tail skid of spring leaf type

Specifications and performance figures as supplied to AVIATION by the manufacturer follow

Length overall	22 ft. 1 in.
Height overall	7 ft
Wing span	34 ft. 6 in
Chord	5 ft 6 in
Airfoil section	Clark Y
Wing area	190 sq ft
Aileron area	16 sq ft
Stabilizer area	12 5 sq ft
Elevator area	11 sq ft
Fin area	4 sq. ft.
Rudder area	6 sq. ft
Angle of incidence	0
Dihedral angle	0
Weight of plane empty	1,000 lb
Pay load	450 lb
Disposable load	900 lb
Gross weight loaded	1,900 lb
Power plant	Siemens Halske 97 hp

GENERAL NEWS

September Export Figures Announced

WASHINGTON (D C)—September export figures show 30 airplanes, 28 engines, and a miscellaneous number of parts, excepting tires, shipped, at a total value of $639,765

Mexico paid $92,927 for nine planes, while six went to Chile for $80 000 and six to Canada for $37,400 Other countries receiving craft were as follows Italy, two worth $53,000, Honduras, two worth $19,645, Argentina two worth $18,825; Brazil, one worth $31,-200; and China, two worth $55 310

Panama received a total of eight engines, representing a value of $28 118 while Poland and Danzig got two, costing $13,109, and Canada two costing $17,908 Power plant shipments to other countries were three to Germany, valued at $7,332 one to Soviet Russia in Europe, valued at $5,097; one to Nicaragua, valued at $4,000, two to Mexico, valued at $8 820 one to Trinidad and Tobago, valued at $766 six to Argentina, valued at $2 770 one to Chile valued at $5 717; and one to Surinam, valued at $4,000

Parts, excepting tires, shipped to Canada were worth $59,379, while values of shipments to other countries were as follows Belgium, $5 675 Czechoslovakia, $106; France, $1 016 Germany, $2,139; Italy, $1,728; Netherlands, $2,708; Soviet Russia in Europe, $5 362; Sweden, $596; United Kingdom $1 952, Panama, $3,765; Mexico $24,-337; Trinidad and Tobago, $134; Cuba, $3,242, Dominican Republic, $51; Republic of Haiti, $13, Virgin Islands $600; Argentina, $2,574; Brazil, $212 Chile, $4,755; Colombia, $2,668; Peru, $13,630; China, $310; Japan, $9,229 Philippine Islands $4 645 Australia, $2,401; Hawaii, $50, Porto Rico, $2,544

Install Pioneer Laboratory

BROOKLYN (N Y)—Pioneer Instrument Company, a subsidiary of Bendix Aviation Corporation, is now installing a laboratory in its new plant here which will occupy 10 000 sq ft; and be given over entirely to experiments on aircraft instruments Among the instruments to be employed in the work will be one for testing optical equipment and another will be similar to an electric refrigerator where indicators can be tested in temperatures as low as 60 deg below zero Centigrade

To Build Float-testing Channel

OTTAWA (ONT)—Construction of a $40,000 water channel to be used in conducting experiments on seaplane and amphibion floats is to be begun by the National Research Council

Draft Reciprocal Agreement For U.S.-Canada Civil Flying

Loss of Peaches Advances Aviation

COLUMBUS (OHIO)—Even peach trees must be sacrificed in the interests of aviation it appears, and owners should bear the loss nobly

A plane recently ruined several trees of that variety in a forced landing on the farm of C A Alexander, Amherst, Ohio. When Alexander started court action to recover damages, State Director of Aeronautics John M Vorys had this to say 'Every person will be forced to undergo certain minor inconveniences and adjustments as to his life and property which will be uncompensated and will be that individual's part in the development of aviation.'

Detroit Glider Meet, Nov. 23-24

DETROIT (MICH)—A two-day glider meet at the Ford and Municipal Airport here, has been planned in connection with this city's observance of National Glider Week, it was announced recently by officials of the National Glider Association The local meet will begin on November 23, extending over the 24th, and at least nine clubs will compete in the events Four cups for the winners of the duration and the landing-to-a-mark contest have been put up by members of the Aircraft Bureau of the Detroit Board of Commerce and Detroit Aircraft Club, according to Ray Cooper, manager of aircraft events for the board, and chairman of the Contest Committee

New Great Northern Division

ST PAUL (MINN)—An aviation supply and repair division has been organized by Great Northern Aviation Corporation to operate through its system Mark M Hurd president has announced The new department will distribute, sell and service complete lines of aeronautical supplies as well as repair all makes of planes W H Ainsworth formerly of Universal Air Lines Minneapolis has been made general manager of the department.

Arrangement in Force Following Legation Note

WASHINGTON (D C) — United States and the Dominion of Canada have effected a reciprocal agreement concerning aircraft and their operation between the two countries This new arrangement went into force following receipt of a note by the State Department from the Canadian Legation here, on Oct. 22, confirming previous discussions and results on the question of air transportation between the countries.

In 1920, Canada and the United States established an understanding which has been repeatedly renewed since that time for periods of six months but on Aug 2, 1927, the Canadian Government suggested that the old aviation code be brought up to date and made reciprocal Promotion of commercial aviation between the two countries is one of the aims of the new agreement, of which parts of the text are as follows.

Article 1 All state aircraft other than military, naval, customs and police aircraft, shall be treated as civil aircraft and as such shall be subject to the requirements hereinafter provided for civil aircraft.

Planes Must Be Licensed

Article 2 Subject to the conditions and limitations hereinafter contained and set forth, Canadian civil aircraft shall be permitted to operate in the United States and, in like manner, civil aircraft of the United States shall be permitted to operate in the Dominion of Canada.

Article 3 Canadian aircraft before entering the United States, must be registered and passed as airworthy by the Canadian Department of National Defense and must bear the registration markings allotted to it by that Department Aircraft of the United States before entering Canada must be registered and passed as airworthy by the United States Department of Commerce, and must bear the registration markings allotted to it by that Department, preceded by the letter "N," placed on it in accordance with the Air Commerce Regulations of the Department of Commerce

Article 4 Canadian aircraft making flights into the United States must carry aircraft engine and journey logbooks and the certificates of registration and airworthiness, issued by the Canadian

(Concluded on Next Page)

Draft U.S.-Canada Civil Flying Agreement

(Continued from page 987)

Department of National Defense. The pilots shall bear licenses issued by said Department of National Defense. Like requirements shall be applicable in Canada with respect to aircraft of the United States and American pilots making flights into Canada. The certificates and licenses in the latter case shall be those issued by the United States Department of Commerce; provided, however, that pilots who are nationals of the one country shall be licensed by the other country under the following conditions:

(a) The Department of National Defense of the Dominion of Canada will issue pilots' license to American nationals upon a showing that they are qualified under the regulations of that Department covering the licensing of pilots; and the United States Department of Commerce will issue pilots' licenses to Canadian nationals upon a showing that they are qualified under the regulations of that Department covering the licensing of pilots.

Countries Offer Like Privileges

(b) Pilots' licenses issued by the United States Department of Commerce to Canadian nationals shall entitle them to the same privileges as are granted by pilots' licenses issued to American nationals, and pilots' licenses issued by the Department of National Defense of the Dominion of Canada to American nationals shall entitle them to the same privileges as are granted by pilots' licenses issued to Canadian nationals.

(c) Pilots' licenses granted to nationals of the one country by the other country shall not be construed to accord to them the right to register aircraft in such other country.

(d) Pilots' licenses granted to nationals of the one country by the other country shall not be construed to accord to them the right to operate aircraft in air commerce unless the aircraft is registered in such other country in accordance with its registration requirements except as provided for in Paragraphs (a) and (b) of Clause 6, with respect to discharging and taking on through passengers and/or cargo.

Permits for Photography

Article 5. No Canadian aircraft in which photographic apparatus has been installed shall be permitted to operate in the United States nor shall any photographs be taken from Canadian aircraft while operating in or over United States territory, except in cases where the entrance of such aircraft or the taking of photographs is specifically authorized by the Department of Commerce of the United States. Like restrictions shall be applicable to aircraft of the United States desiring to operate in or over Canadian territory, and in such cases the entrance of aircraft in which photographic apparatus has been installed and the taking of photographs shall not be permissible without the specific authorization of the Department of National Defense of Canada.

Article 6. (a) If the Canadian aircraft and pilot are licensed to carry passengers and/or cargo in the Dominion of Canada, they may do so between Canada and the United States, but not between points in the United States, except that subject to compliance with customs, quarantine and immigration requirements, such aircraft shall be permitted to discharge through passengers and/or cargo destined to the United States at one airport in the United States according landing facilities to foreign aircraft, and to proceed with the remaining passengers and/or cargo to any other airports in the United States, according landing facilities to foreign aircraft, for the purpose of discharging the remaining passengers and/or cargo, and they shall in like manner be permitted to take on passengers and/or cargo destined to Canada at different airports in the United States on the return trip to Canada.

(b) If the United States aircraft and pilot are licensed to carry passengers and/or cargo in the United States they may do so between the United States and Canada, but not between points in Canada, except that subject to compliance with customs, quarantine and immigration requirements such aircraft shall be permitted to discharge through passengers and/or cargo destined to Canada at one airport in Canada according landing facilities to foreign aircraft for the purpose of discharging the remaining passengers and/or cargo to any other airports in Canada, according landing facilities to foreign aircraft for the purpose of discharging the remaining passengers and/or cargo, and they shall in like manner be permitted to take on passengers and/or cargo destined to the United States at different airports in Canada on the return trip to the United States.

Accept Airworthy Certificates

Article 7. The right accorded to Canadian pilots and aircraft to make flights over United States territory under the conditions provided for in the present arrangement shall be accorded subject to compliance with the laws rules and regulations in effect in the United States governing the operation of civil aircraft. The right accorded to American pilots and aircraft of the United States to make flights over Canadian territory under the conditions herein provided for shall be accorded subject to compliance with the laws rules and regulations in effect in Canada governing the operation of civil aircraft.

Article 8. Certificates of airworthiness for export issued in connection with aircraft built in Canada imported into the United States from Canada as merchandise will be accepted by the Department of Commerce of the United States if issued by the Department of National Defense of the Dominion of Canada in accordance with its requirements as to airworthiness. Certificates of airworthiness for export issued in connection with aircraft built in the United States imported into Canada from the United States as merchandise will in like manner be accepted by the Department of National Defense of Canada, if issued by the Department of Commerce of the United States in accordance with its requirements as to airworthiness.

Article 9. It shall be understood that this arrangement shall be subject to termination by either Government on sixty days' notice given to the other Government by a further arrangement between the two Governments dealing with the same subject or by the enactment of legislation in either country inconsistent therewith.

Canada Has 313 Private Pilots

OTTAWA (ONT.)—September reports issued by the Department of National Defense Air Service show there were 313 private pilots at September's close.

Errett Williams Wins 320-Mi. Brandeis Derby

OMAHA (NEB.)—Errett Williams of Greensville, S. C., flying the Eaglerock Bullet in which he has won many races during the past season, took first money of $1,000 in the Brandeis Jubilee Derby, a 320-mi. race held here during the Jubilee Air Show and Aviation Exposition.

Williams' plane was second in speed to the Travel Air "mystery plane" powered with a 225 hp. Whirlwind engine, flown by Ted Wells but the formula used and the fact that Wells had difficulty in locating one of the two control fields, pushed his craft down to fourth place in points rating. Wells averaged 156.8 m.p.h., and Williams, 143.1.

Bill Grigsby of Tulsa, Okla., flying a Spartan powered with a 165 hp. Wright, won second money, though his average speed of 120.2 m.p.h. was beaten by Bill Ong of Kansas City, who averaged 127.1 m.p.h. in a Ken-Royce powered with a 170 hp. Curtiss Challenger, winning third place, and by F. D. "Chief" Bowhan of Omaha, who averaged 134.5 m.p.h. in a Cessna powered with a 220 hp. Whirlwind.

Williams also won the feature event of the second day of the show, a 25-mi. race open to engines of 175 hp. or less, run around a triangular course. Ong was second in this and, due to his neat work in turning the pylons, forced Williams to extend his plane to win. Verne Roberts of Moline, Ill., in his "Little Sweetheart" Monocoupe, powered with a Warner engine, was third and L. D. Miller, Council Bluffs, Ia., in Grigsby's Spartan, fourth.

Roberts won the 110 hp. race, over the same course the following day, quite handily. Art Chester of Joliet, Ill., in an OX-5 Travel Air, was second, and Mac King of Ames, Ia., flying a Monocoupe with a 60 hp. Velie was third.

Chester won the 25-mi. race for OX-5's. Jack Kolbenschlag, Lincoln, in a Curtiss Robin, was second and Andy Nielsen, Omaha, flying another Robin, took third.

Walter R. Johnson was manager of the show, and Amos Thomas was chairman of the committee in charge.

Exhibit New P-6 Pursuit Plane

ROOSEVELT FIELD (L. I.)—One of the first demonstrations of the new Army pursuit plane, the Curtiss P-6, was given here on Nov. 10 by Lieut. James A. Doolittle, noted Army pilot. It is a development of the Curtiss Hawk and is powered with a Conqueror engine. The exhibition was given in connection with an aerial program staged by the Aviators' Post of the American Legion during which a record for consecutive parachute jumping was made when fifteen men and one woman jumped one after another from a twin-engined Sikorsky S-35, at an altitude of 3,000 ft.

New Aircraft Products Are Exhibited at Chicago

CHICAGO (ILL.)—Increasing interest in the aircraft industry as a market for their products was manifested by the automobile accessory manufacturers, forming the Motor and Equipment Association, in the exhibits arranged for the International Exposition of Automotive Parts recently conducted by the organization in the Coliseum.

Although primarily a show for the display of automobile shop supplies, parts and accessories, many of the manufacturers also exhibited adaptations of standard automobile equipment to aircraft use, while other showed tools especially designed for aviation work. Nearly all expressed a desire to enter the industry, but a lack of information concerning the needs and a scarcity of distributing agencies, they felt, offer handicaps.

Still some are going ahead in the production of aviation materials as indicated by the exhibits. A number of products displayed are already known to the aeronautic industry, others have yet to be introduced. One of the most noteworthy in the latter classification is a new acetylene welding torch developed by The Bastian-Blessing Company, this city.

The principal feature of the new torch is in the placing of the hand wheels which regulate the needle valve. Instead of being below the handle as in many torches, they have been placed above. One of the valves is a right and the other a left. As a consequence it is possible to operate either one or both with the thumb of the hand holding the torch. This is a great advantage in finishing construction, it is said, where a variation in the flame is often necessary to obtain a proper weld.

For Use in Close Quarters

Other features of the "AP" model, as the torch is known, are its light weight and small head. The weight is 11 oz. with any of the six tip sizes that may be obtained. The small head making it possible to use the torch in close quarters, is obtained by fitting the tip with female threads so that it is screwed directly to the gooseneck.

A 'Pony" socket wrench set for use on aircraft engines was exhibited by Stevens Walden-Worcester, Inc., Worcester, Mass. This set takes hexagonal nuts up to ¾ in. "across the hex." Its feature lies in the use of thin walled 12-point sockets instead of the more usual six sided type. The 12-point socket permits tightening a nut 1/12 of a turn if desired, so that the wrenches, which are constructed of chrome nickel, may be used almost anywhere.

Two firms featured their magneto, generator and electric starter test benches. These were Burton and Rogers Manufacturing Company, Boston, Mass., and Joseph Weidenhoff, Inc., Chicago, Ill. Stands of both types are now used by some of the leading airlines, it is reported. In addition to the benches, Burton and Rogers showed a new device for the testing of spark plugs under pressure and also the leakage of condensers. This unit is to be incorporated in a new test bench designed for aircraft use. The Weidenhoff firm also exhibited a magneto recharger.

A small electric drill, 9 in. long, and with a diameter of 2½ in. at its widest point, was shown by Millers Falls Company, Millers Falls, Mass. It was designed for aircraft use, and is known as the "Aeroplane Drill." It has a composition case and may be operated with or without an auxiliary grip handle. It takes bits up to ¾ in. and weighs 3 lb.

Among the valve seat reamers for aircraft engines shown was a set produced by Albertson and Company, Sioux City, Ia. The reamers are constructed of Swedish steel, which, it is said, does not dull in cutting bronze as do other metals. Connecting rod aligners, valve refacers, pressure spray guns, air compressors and other articles of use in the aircraft industry were exhibited by other manufacturing concerns.

Navy Orders 36 Baum Pontoons

LONG ISLAND (N. Y.)—An order for 36 all-metal pontoons, to be used on T4-M1 Navy seaplanes, has been received by Seymour J. Baum, Inc., aircraft producers of Elmhurst, from the United States Navy. The order is valued at $117,000.

Cheers and Flowers—The Russians Reach New York

AN OVATION GREETED the four Russian flyers when they landed at Curtiss Field, Valley Stream, L. I., Nov. 1, completing their 12,500 mi. trip from Moscow to New York via the Bering Straits in their twin-engined plane, "Land of the Soviets." Here they are following presentation of flowers from admirers. Left to right, Dimitri Fufaev, Semyon Shestakov, Boris Sterlingov and Philip Bolotov.

Curtiss-Wright Maps 8,481 sq. mi. Flood Area

NEW YORK (N. Y.)—A survey covering 8,481 sq. mi. of the Mississippi flood district has recently been completed by the Curtiss-Wright Flying Service, William L. Hamilton, manager of the aerial survey division announces. The resulting photographs will be laid before Army engineers studying the problems of relief and reconstruction work as outlined on President Hoover's Flood Control Program.

Parts of Missouri, Kentucky, Tennessee, Arkansas, and Mississippi composed the area, which took 90 days to map with five planes in the air approximately 412 hr., flying a distance of 38,552 mi. Most of the photographing was done at an average altitude of 12,400 ft. and to make the work as accurate as possible, special type altimeters were used.

However, it was found necessary to reduce or enlarge each one of the 33,257 prints which the Government received to a common scale in order to keep altitude differences within ten feet. A contract is soon to be let for mapping a 4,000 sq. mi. territory further south.

Braley Offers New Wind Cone

WICHITA (KAN.)—Braley School of Flying, this city, now offers a ball bearing wind cone to the market.

Gyroscopic Pilot Declared Success

Army Plane Uses Device On Dayton-Washington Trip

WASHINGTON (D C)—Following the flight of a tri-engined Ford plane from Wright Field, Dayton, Ohio, to Bolling Field, the War Department announces completion of successful tests on an automatic pilot device which flew the plane most of the distance on that trip Lieut. Albert F. Hegenberger California-to-Hawaii pilot, Maj A H Gilkeson, chief of the equipment division of Wright Field, Capt. S. L. Blair, of Wright Field and Elmer Sperry, Jr., inventor of the new device which is a product of Sperry company, made the flight.

Two gyroscopes, one horizontally and the other vertically mounted, working on a system of electrical contacts kept the craft in an even position. A fog encountered over the mountains, was successfully passed through on an even keel by operation of the gyroscopes; and once Hegenberger had set the stabilizer after taking off, he did not resume control of the plane until about 30 mi from Washington when some slight mechanical trouble put the device temporarily out of use

To Aid in Night and Fog Flying

This automatic pilot invention had been previously tested out in flights between New Bedford and New York City, New York City and Dayton and Dayton and Detroit Its great advantages, the War Department claims will be in making night and fog flying much safer, and will not only keep the plane in steadier flight than the human hand but give the pilot a chance to watch his instruments more closely and attend to other details of flight. Explaining the device in detail, the War Department has this to say:

"The model which is said to weigh but 50 lb and to occupy a space of only 14x14x10 in beneath the pilot's seat, represents the culmination of many years' effort Its operation actuates the three major controls of an airplane namely the rudder for direction the elevator for upward and downward movement and the aileron for maintaining lateral balance

Plane Moves About Gyroscope

"One vertically mounted gyroscope and one horizontally mounted gyroscope the armatures of which are electrically driven at 15,000 r.p.m, are used, and the power required is provided by an externally mounted wind driven electric generator. The gyroscopes maintain certain definite positions regardless of the motion of the airplane itself The airplane, actually moving around the gyroscope, makes and breaks certain electric circuits. In these electric circuits are mounted three pairs of electro magnets The making of a contact will energize one of the electro magnets which in turn operates a small clutch connected with that particular control which is needed.

"Power is supplied by means of a flexible shaft from the generator shaft which provides mechanical power as well as electric power for the gyros and it is this mechanical power which actually controls the airplane For instance, let us assume that the airplane is tilted by a gust of wind to the left, that is, with its left wing down. The gyroscope maintains its vertical position and the airplane moves a few degrees around it making a simple electrical contact which closes the circuit and causes one electromagnet to become magnetized This magnet attracts a small clutch control member linking the flexible power shaft through gears to the aileron control cable

"The resulting pull on the cable brings the airplane back to an even keel Three clutches each one of which responds to a pair of electro-magnets, are required to transmit power for operation of the three major controls

"This controlling action is exactly what an experienced pilot would do except that it starts promptly and continues with a smoother action It is said that the new automatic pilot is sensitive to a change of movement of one half of one degree of the airplane about its axis, which is more sensitive than the average pilot.

Aerial Potato Race is Planned

ST LOUIS (MO.) — An aerial potato race in which the pilots must land, pick up a potato, and take off again, repeating this maneuver several times, is to be a feature of an aerial circus on Nov 17, being staged at Parks Airport. Only winners of the OX 5 engine race, will be eligible to participate in this novelty Other numbers on the program will include parachute jumps.

Test New Browuback Engine

POTTSTOWN (PA)—Brownback Motor Laboratories, this city, announces that first demonstration flights of the new Brownback C-400 radial air-cooled engine has been made at Buffalo with the plant installed in a Fleet plane. The engine is described by the manufacturers as a low-speed heavy-duty power plant. The demonstration plane is now at Roosevelt Field L I where it will be displayed prior to a trip which will include Rochester, Hammondsport, Bridgeport, Farmingdale L. I., Philadelphia, New Castle Pa, Baltimore, Hagerstown, Md Pittsburgh Columbus Dayton, Troy Richmond Ind Indianapolis St Louis Marshall Mo Kansas City and Wichita

Form New Aero Branch Divisions

Blee and Budwig Heads; Cancel Air Director Post

WASHINGTON (D C)—Instead of appointing a new Director of Aeronautics to fill the present vacancy in that office, Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, stated on Nov 11 that it has been decided to divide the responsibilities of the position between two division heads. This has been made necessary, it is asserted, because of the increasing demands made on the Aeronautics Branch by the rapid development of civil aviation

The work of the Aeronautics Branch, formerly supervised by the Director, will be classified into two main groups Licensing and inspection Service, and Aeronautic Development Service. Harry H. Blee, present chief of the Airports Division, has been appointed to the directorship of the Aeronautic Development Service. Gilbert G. Budwig, on the other hand, has been named director of the Licensing and inspection Service Mr Budwig was recently made Assistant Director of Aeronautics and has been holding that position until the completion of the reorganization plans

These changes will be effective immediately Mr. Blee's successor as Chief of the Airport Division will not be named at this time, it is stated. The split-up of activities of the Branch will not affect the Airways Division, headed by F. C. Hingsburg

Ryan Institutes Flat Rate Repairs

ST LOUIS (MO)—Ryan Aircraft Corporation has introduced a system of flat rates on airplane repairs and service operations, thereby following the method of set charges which have been adopted almost universally in the automotive industry. For example, when at certain intervals a plane must be recovered, equipped with new control wires, have its streamlining retouched and receive other repairs, through the new system, the operator may now wire the factory and learn the exact cost of the operation and obtain a definite date for the completion of this work. The Ryan organization has approximately fifty distributors and dealers located in all parts of the country and most of them can do any ordinary work on the plane in outlying territory where experienced airplane mechanics and proper materials are not available, the company sends mechanics from the main plants to do the necessary work.

Moto Meter Instruments to Navy

LONG ISLAND CITY (N Y)—Moto Meter & Gauge Equipment Corporation has received an order from the United States Navy Air Service for 500 oil pressure gauges, 300 fuel pressure gauges and 900 thermometers

The Ring Laying Ceremony as Seen From a Mangar Catwalk

Army Seeks Recipients Of Mackay Prize Awards

WASHINGTON (D C.)—Efforts to locate members of the Air Corps who are entitled to a Clarence H Mackay Trophy award, are being made by Maj-Gen James E. Fechet, Chief of the Army Air Corps The trophy is presented each year to the Army flier or fliers selected as having performed the most noteworthy air achievement for the Army. This year the recipient was Lieut Harry A Sutton

The following men or their heirs are sought to receive the award:

Col Townsend F Dodd, winner of the Mackay Trophy in 1914 for a reconnoissance flight. Colonel Dodd was killed before receiving the medal

Lieut Belvin W Maynard the "Flying Parson" one of the crew of the Atlantic-Pacific flight and return in 1919 Lieutenant Maynard resigned before receiving the medal

Lieut R S Worthington also one of the crew of the Atlantic Pacific flight and return in 1919 Lieutenant Worthington resigned and was soon after killed before receiving the medal

Lieut. D B Gish, also one of the crew of the Atlantic-Pacific flight and return in 1919, resigned before receiving the medal

Capt. Clinton F. Woolsey, one of the crew of the South American Good-Will Flight in 1926 Captain Woolsey was killed during the course of the flight

Sgt. Edmund Henrique, one of the crew of the Alaskan Flight in 1920 Sergeant Henrique left the service upon expiration of his term of enlistment before receiving the medal

Hornet Stearmans to Interstate

SKY HARBOR (TENN.)—Three combination mail and passenger Hornet-powered Stearman biplanes have been purchased by Interstate Airlines, Inc

Two More Planes Approved

WASHINGTON (D C)—According to certificate number, make and designation, type, power plant, useful load, and gross weight, the two planes awarded approved type certificates for the week ending Nov 2, were: No 262—Ryan B-7 six-place closed monoplane, Wasp 450 hp., 1,780 lb, 4,283 lb; No 263—Mohawk M f C two-place open monoplane, Kinner 90 hp 618 lb, 1,760 lb

L. & I. Service to Springfield Firm

SPRINGFIELD (ILL.) — Springfield Aviation Company has announced through its president, Carl Sorling the purchase of the L & I Aerial Service, former lessors and operators of Commercial Airport, south of this city. Craig Isbell and Gelder Lockwood are retained for flying operations The lease held by the new company which was incorporated in July 1929, by Mr. Sorling and his associates to engage in all forms of commercial aviation provides for a field of 120 acres, a little over three times as large as the one previously under lease here It was extended so that the large mail planes of Universal Air Lines could land in accordance with the contract recently made between Springfield Aviation Company and the local chamber of commerce.

Pioneer Units on Soviet Plane

NEW YORK (N. Y.)—"Land of the Soviets," the Russian plane which recently landed here after a 12 500 mi flight from Moscow, was equipped with three Pioneer instruments—turn, bank, and pitch indicators, one mounted in front of each pilot and an earth inductor compass The Pioneer Instrument Company's French representative, R E Badin, also supplied the fuel gauge for the craft Other instruments used were of Russian manufacture

Work Is Started On ZRS-4 in Akron

Many Officials Witnessed Master Ring Laying on Nov. 7

AKRON (OHIO)—Rear-Adm William A. Moffett, chief of the Bureau of Aeronautics of the United States Navy, played the stellar role in the first airship ring-laying ceremony ever held in this country, which took place Thursday, Nov 7, in the new Goodyear-Zeppelin airdock at the Akron Municipal Airport He drove a symbolic golden rivet in the master ring of the ZRS-4, first of the two new Navy airships now being built. This act marked the official start of construction on the world's largest airship

The ceremony was witnessed by leading figures in the aeronautical world, Government dignitaries and Army, Navy and Marine Corps officers It is estimated that 50 000 people attended the event, the majority of whom were inside the huge airdock at the time the rivet was driven, yet the building about two-thirds of which was open to the public, was not crowded The entire structure can accommodate nearly 80 000 people, standing

The affair was comparable to the laying of a battleship's keel The ring itself when completed, will be a huge circular segment occupying a center position in the ZRS-4 It is built up of duralumin girders, arranged in two annular outer rings connected by cross girders, in zig-zag fashion, to an inner annular ring In cross section, the ring girder is triangular It does not form a perfect circle but is rather a 36-sided polygon At each corner will be attached longitudinal girders running the entire length of the ship's hull

Los Angeles and Blimps Attend

At the time of the ceremony, the master ring was not complete Only a section that will occupy the highest point in the ship, and a similar section on the opposite side were assembled The ring is 133 ft in external diameter 120 ft on the inside 10 ft thick at the outer edge and when in place in the ship the rivet will be twelve stories above the base

All during the day of the ring-laying ceremony fleets of visiting airplanes the Navy airship "Los Angeles," and the three Goodyear blimps, "Defender," "Mayflower" and "Pilgrim," circled over the airport At 2:30 p.m the giant "orange-peel" doors of the dock swung slowly open for the first time publicly Then, while the "Los Angeles" and the smaller airships drifted overhead, the ceremony proceeded.

Rear Admiral Moffett, Dr Karl Arnstein, chief engineer in charge of construction of the dirigibles, Paul W. Litchfield, president of the Goodyear-Zeppelin Corporation and others spoke telling of the Zeppelin's past development and its future possibilities.

Goodyear Plans Several Projects

To Build Two Airships For Pacific Zeppelin Firm

AKRON (OHIO)—The building here of two commercial Zeppelin type airships and the erection of a second airship factory and dock similar to the one now nearing completion at the Akron Municipal Airport, the construction of another similar hangar in Southern California, and the building of airship mooring masts in Hawaii and the Philippines, are included in the plans for commercial airship development just announced by Paul W. Litchfield, president of the Goodyear Tire & Rubber Company and the Goodyear-Zeppelin Corporation

The two new airships will each have a helium gas capacity of 6 500 000 cu ft., and will be of the same general construction as the two naval Zeppelins of the same size now being assembled at Akron. The commercial ships will be the largest of their type in passenger and express service. They are to be built for the Pacific Zeppelin Transport Co., organization of which was completed in New York on Oct. 28.

Litchfield Named Chairman

It is the intention of the company to operate dirigibles on regular schedule across the Pacific Ocean, in cooperation with regular steamship service now being provided by American companies, as well as that furnished by railroads and airplane organizations.

Stock of the new company is distributed equally among the Goodyear Company, National City Bank of New York, and the banking houses of Lehman Brothers and Grayson M. P. Murphy Company of that city.

Litchfield has been named chairman of the board of the new corporation. J. A. Hunsacker, a Goodyear Zeppelin Corporation vice-president, is president of the Pacific Airship Operating Company. He will also continue his Goodyear connection.

The Pacific airship line will be an all-American institution, and will be in operation by 1933, according to Litchfield. Its purpose is not to compete with existing transportation companies, but to cooperate in providing faster service between its terminal points.

Atlantic Line Also Planned

Another corporation, the International Zeppelin Transport Company, recently was formed for the purpose of operating Zeppelin airships over the Atlantic Ocean, connecting America and Europe. It is being sponsored by Goodyear, and a group of American and European bankers and airship builders while German Zeppelin interests, headed by Dr. Hugo Eckner are also aiding in the venture.

Service on the Atlantic line will not be started as soon as on the Pacific route the delay resulting from the international nature of the company and its activities. Four super-Zeppelins, two to be built in Akron and two at Friedrichshafen, will be used. Operating hangars are to be erected on both sides of the Atlantic.

The first step in the bringing about of established Zeppelin commercial transportation will be the building, in Southern California, of an airship hangar like the $2,500,000 dock nearing completion here. In it will be assembled the first of the two Pacific air liners, the parts of which will be made at the Akron Goodyear-Zeppelin company plant.

Litchfield has predicted that the first of the Pacific ships will be in operation by 1932. By that time, work will have been started on the Atlantic coast dock in which the first of the trans-Atlantic Zeppelins will be put together. Parts for these ships will also be made in Akron, where assembling and housing the first of the Atlantic and Pacific Zeppelins will occupy the two coastal docks.

Ships Designed to Carry 80

Each of the proposed commercial airships will be patterned after the new naval dirigibles, now being built at a total cost of $8 000,000. Each ship will carry 80 passengers and 10 tons of mail and express matter. Their high speed will cut in half the time required for the fastest surface ships.

There has been some discussion of the probability of the Goodycar-Zeppelin Corporation entering the airplane-building field. Litchfield, in a recent statement, said that the company does not plan to enter the heavier-than-air craft construction field until it has the lighter-than-air industry well established.

The Dornier Airplane Corporation is a subsidiary of the German Zeppelin Corporation, under whose patents the American company is operating. Therefore, the Goodyear-Zeppelin Corporation is at liberty to proceed with the construction of airplanes whenever it sees fit. It would not be difficult to build huge Dornier type all-metal planes in the Akron duralumin shops which are now engaged in building the framework for the new Zeppelins.

Form Canadian Air Association

MONTREAL (CAN.)—According to Assistant Trade Commissioner A. H. Thieman, Ottawa, there has recently been incorporated here with a dominion charter and no share capital, the Canadian Association of Aeronautical Interest. The principal aims are —to promote a market for Canadian planes, engines, and parts; 2—to reform abuses incurred in the foregoing; 3—to free its members from unjust laws or exactions which may be impounded; 4—to diffuse information regarding other firms in the aircraft industry; 5—to procure uniformity and certainty in customs and usages of aircraft trade and commerce; 6—to foster proper and fair aeronautical laws, and 7—to settle any and all differences which may arise among members or the business of any of them.

Aviation Corporation To Acquire S.A.T. Shares

NEW YORK (N.Y.)—Through an application approved by the Board of Governors of the New York Stock Exchange, 117,925 shares of the Aviation Corporation stock is offered to shareholders of Southern Air Transport, Inc., on an exchange basis of three Aviation shares for four of the Southern certificates, which will enable The Aviation Corporation to acquire a minority interest in the other concern.

This announcement was made by Alexander Cushny, treasurer of the acquiring company, who also states the offer is only good until Jan. 1, 1930. His firm already owns 242 767 shares of the outstanding 400,000 shares of Southern's stock.

President of Southern Air Transport, Inc., A. P. Barrett, has said he will exchange his own holdings for Aviation stock, which means he will receive 39,750 shares of it for 53,000 shares of his own company's stock.

From February, 1929, the date of organization, until August of this year, Southern Air Transport showed an earned surplus of $71 107 60, while Aviation's sheets showed earnings of $.34 per share from Mar. 1 to Aug. 31. Before federal taxes, its net income was $1,040 412 58.

Organize U. S. Company To Build Haw Propellers

NEW YORK (N.Y.)—A branch of the Haw Metal Propeller Works of Germany has been formed in this country under the title of Haw Metal Propeller Works, Inc., with Herman Katz, a former director of Bonwit Teller & Company, as president. Miles M. Sherover is to be the general manager while directors will include Wilhelm Haw, head of the German firm, and Max Sherover.

The Haw company has been the manufacturer of a hollow aluminum blade which is used a great deal throughout Europe and recently announced perfection of a propeller whose pitch is adjustable while in flight through a control unit on the pilot's instrument board. Successful tests have been held of this new type.

It is said the United States Navy has been interested in Haw propellers and is desirous of having some American corporation produce them in this country. No decision has yet been reached concerning the issuance of public stock, as several negotiations with other propeller firms are pending.

Sanction Baltimore Exhibit

NEW YORK (N. Y.)—Baltimore's first Annual Aircraft Show, to be held Dec. 9-14, has been granted a class "C" sanction by the Aeronautical Chamber of Commerce and has been recommended to aircraft distributors and dealers in that section.

Approvals Announced

WASHINGTON (D. C.)—Five more planes were awarded approved type certificates during the week ending Nov. 9. Classed as to certificate, make and designation, type, power plant, useful load, and gross weight, they are: No. 265—Paramount Cabinaire, four-place closed biplane, Wright R-540, 165 hp., 1 010 lb., 2,630 lb.; No. 267—Verville 104, four-place closed monoplane, Wright R-760, 1,275 lb., 3,400 lb.; No. 268—Curtiss Robertson Robin W, three-place closed monoplane, Warner 110 hp., 780 lb., 2,300 lb.; No. 269—Curtiss Fledgling J-2, two-place open biplane, Wright R-760, 886 lb., 3 005 lb.; No. 270—Curtiss-Robertson Robin 4-C, four-place closed monoplane, Challenger 170 h.p., 924 lb., 2,600 lb.

Engines

Approved type engine certificate No. 32 was given the Continental A70, 7 cyl., radial air-cooled, engine, with 165 h.p. at 2,000 r.p.m.

Propellers

According to certificate, number, manufacturer, model designation diameter pitch, horsepower and revolutions per minute, the following propeller has been approved: No. 132—Curtiss, Ex-33570, 8 83', 5 25' 170/1800.

Schools

Schools recently approved by the Aeronautics Branch include: Von Hoffman Aircraft School, Lambert Field, Anglum, Mo., ground and flying, for Transport, Limited Commercial and Private licenses; Curtiss Flying Service of the Middle West, Inc., Curtiss Reynolds Airport, Glenview, Ill., ground and flying, for Transport, Limited Commercial and Private licenses; Spartan School of Aeronautics, Apache Blvd. and Chamberlain Drive, Tulsa, Okla., ground and flying, for Transport, Limited Commercial and Private licenses, and Boeing School of Aeronautics, Oakland Municipal Airport, Oakland, Calif., ground and flying, for Transport, Limited Commercial and Private licenses.

Cleveland Bids for Bennett Race

CLEVELAND (OHIO)—This city is considering plans for holding airplane races in conjunction with the Gordon Bennett Balloon Race if it is awarded that classic in 1930. The Chamber of Commerce and other local groups would hope to raise about $20 000 from plane contests with which to defray expenses connected with the Balloon competition.

Air Show After 1932 Olympics

LOS ANGELES (CALIF.)—An international aircraft show is being planned for Los Angeles in 1932, immediately following the staging of the Olympic Games in this city. It will be sponsored by the Southern California Chapter of the National Aeronautic Association.

Plan for 1930 Boston Meet

BOSTON (MASS.)—Plans are in the making for a 1930 airplane race meet centered at the Boston Airport, to be run under the joint auspices of the American Legion and the Boston Commercial Airplane Operators' Association, or a committee formed from these and several other organizations. It will take the form of an air circus, and will probably be held during the week of the national convention of the American Legion here. Following the meet the group of planes would tour other New England cities and stage local air meets.

Association Formed By Clubs in Dominion

FORT WILLIAM (ONT.)—J. A. Sully, president of the Winnipeg Flying Club was recently elected president of the Canadian Flying Clubs' Association which held its organization meeting on Nov. 1 in this city. Other officers installed were: T. N. Robert, Ottawa, honorary secretary; S. H. Richard, Fort William, treasurer; L. Miller, vice-president of the British Columbia district; R. A. Delhaye, Regina, vice-president of the Alberta and Saskatchewan district; H. B. Crabbe, Winnipeg, vice-president of the Manitoba and Thunder Bay district; Earl M. Hand, vice president of the Ontario and Quebec district; and R. J. Nelson, Halifax, vice-president of the Maritime Provinces.

Twenty delegates of various flying clubs throughout the Dominion, attended the conference, which followed sectional meetings held at Ottawa and Regina. The Canadian Flying Clubs' Association will be the official spokesman of all the clubs and will handle the various problems which arise.

Maryland Company Acquires Coastal Firm

NEW YORK (N.Y.)—Maryland and Delaware Navigation and Aeroplane Company has acquired Coastal Airways, Inc., according to an announcement made by D. E. Angelis, president of the latter concern, on behalf of his concern and for James R. Pratt, president of the Navigation company.

All operations of Coastal Airways which operated a line this summer from New York to Albany and one from New York to Washington, will be concentrated in Baltimore. According to Mr. Angelis, who is to become vice-president in charge of operations for the Maryland and Delaware concern, plans are under way to operate the following lines: New York to Albany, Albany to Saratoga, N. Y.; Boston to New York, New York to Baltimore, New York to Washington, Baltimore to Atlantic City, Washington to Norfolk, Va.; and Washington to Miami, Fla.

The merging of these two firms makes the resulting organization the first flying corporation to be known as a public utility and coming under the supervision of the Public Service Commission of Maryland. The Maryland and Delaware Navigation and Aeroplane Corporation holds a franchise to operate lines out of Maryland.

Thompson Valve to P. & W. Firm

CLEVELAND (OHIO)—Thompson Products, Inc., has received a release order for 20 000 airplane engine valves, valued at $100,000, from Pratt & Whitney Aircraft Company, as part of a million dollar contract let earlier in the year. Additional orders have been received lately from Curtiss Aeroplane & Motor Company, firm officials assert.

Many-Named German Baron Plus Little Klemm Started for Moscow But Ended at New York City

NEW YORK (N. Y.)—Sometime last August, 23-year-old Baron Friedrich Karl Paul Richard August Freiherr Koening von und zu Warthausen of Berlin, with seventeen hours in the air to his credit, climbed into his low-wing, Klemm-Daimler monoplane powered with a two-cylinder, twenty horsepower engine, and soared off for Moscow. He was out to win the Hindenburg Cup, offered for the most noteworthy amateur German flight.

He covered the 1,180 mi. at the rate of 90 m.p.h. and used just 38 gal. of gas in getting to Moscow through wind-driven rain. But upon thinking it over, he was afraid he hadn't flown far enough, so he tuned up the "flying motorcycle" as he called his craft, and soared off again—this time for Persia.

The next thing he knew, he was at Karachi, in India. There word from the German Government informed him that he had certainly won the prize and added words as much as to say, "but be a good boy and please come home now."

Well, the Baron wasn't thinking of home, so he didn't bother about the advice. The result was that when he landed at Roosevelt Field, L. I., on Nov. 4, he had covered over 17,000 mi. and among various places, had stopped in Afghanistan, Burma, Singapore, Siam, China, Japan and several spots in the United States. Over the Pacific and other water stretches, he shipped himself and plane by boat.

Three forced landings and one instance in which he ran out of gas, were the only air mishaps befalling the Baron. But he met his waterloo in El Paso, while riding in a taxicab. When he came to, he was in a hospital and stayed there for three weeks. Finally well enough to continue by air, he came into New York where after being welcomed by Mayor Walker, he again crated his plane and took a boat for Germany. A Munich museum will get the craft and the Baron the prize.

All-California Tour Completed

Two Score Planes In Three-Class Flight

LOS ANGELES (CALIF.)—Favored by the usual 'California weather" planes of the First All-California Good-Will Air Tour successfully completed the route of approximately 1,200 mi by landing at the Los Angeles Municipal Airport on Nov. 7, after visiting fourteen of the leading California cities With 42 planes in the line-up at the start, there were several acquisitions and several delinquents during the four days of the tour so that the final number to land was 43 planes, one more than started

Staged for the purpose of advertising the Western Aircraft Show being held in Los Angeles from Nov 9-17, the tour was a non competitive event sponsored by the Los Angeles Junior Chamber of Commerce in cooperation with civic groups along the route No advertising and no individual flying at the various tour stops was permitted

Among leading pilots to participate were Col Arthur C Goebel, Lieut D W. Tomlinson, Emory Bronte Waldo Waterman Lee Schoenhair Paul Richter, and the three women pilots, Vera Dawn Walker, Mrs Florence Barnes, and Margaret Perry

Speakers Aid Exposition

The Western air show was boosted at the various civic functions by a corps of speakers who included Kennedy Ellsworth president of the Los Angeles Junior Chamber of Commerce Fred A Worthey, president of the California Aircraft Exposition Corporation; Clifford W Henderson, managing director of the Western Aircraft Show, Col. Richard Barmtz, Director of Airports for the city of Los Angeles Waldo Waterman, C F Lienesch, and Adna Leonard

Officials in charge of the tour included W. E. Thomas, chairman of the air tour committee, Ted Schleuter, chairman of advance arrangements Dudley Steele, chairman of the operations committee, C F Lienesch, flight commander; Comdr E M Pace, statistical officer, Dr George H. Ham, flight surgeon (who enjoyed an uninterrupted four day vacation) and Joe Nikrent starter.

The Tour itinerary was as follows leaving the Los Angeles Metropolitan Airport, Van Nuys, to Santa Maria, 132 mi; lunch stop Santa Maria to Salinas, 143 mi.; Salinas to Oakland 88 mi.; overnight stop Oakland to San Francisco, 12 mi.; San Francisco to Sacramento 77 mi., noon stop Sacramento to Stockton, 55 mi Stockton to Fresno 120 mi., overnight stop Fresno to Visalia 45 mi Visalia to Bakersfield 65 mi. Bakersfield to San Bernardino 140 mi. lunch stoop, San Bernardino to El Centro 140 mi., overnight stop El Centro to San Diego 120 mi.; San Diego to Long Beach, 90 mi., Long Beach to Los Angeles municipal Airport, 25 mi. Although tour planes crossed seven mountain passes calling for altitudes of 6 000 to 10,000 ft., and on three different legs of approximately 140 mi. each were over the most desolate desert country every stop was made on schedule and no serious mishaps marred the trip

For easy handling of the many types of planes entered in the tour it was divided into three groups "A' group, led by W. E. Carey containing planes with a cruising speed of 70 to 100 m.p.h.; 'B' group led by Mike Doolm. containing those planes with cruising speeds of approximately 100 m.p.h.; and "C" group, led by Tommy Fowler

Reporters at work in the Maddux Ford used by press representatives in the All-Cali fornia Air Tour Telephone connections were effected through wires carried to the plane by a truck at each airport visited

with planes of 120 m.p.h. cruising speed The feature of the tour from a flying angle was the manner in which 'B" group was organized by Mike Doolm, so that an impressive formation flight was staged over every town visited. With widely varying types of planes, pilots of many stages of experience and unaccustomed to formation flying, and without preliminary rehearsal or other practise than that possible while flying from town to town the "B" group staged tight Vee. line, and column formations. Led by Mike Doolm in the Standard Oil Company Boeing 40-B the other members of the group in order were: R S Macallister, Fairchild KR-3. Roy T. Minor Stearman, Edward Magruder Waco Al Larry, Timm 'Collegiate"- Vera Dawn Walker and Jim Granger Swallow- William Hampton, Waco P V. Wall, Curtiss Robin; Arthur Callies, Waco Gerald Mounce Fleet W. L Seifer, Emsco "Cirrus' Mid Wing- C A "Bud" Hussey, Spartan Dick Myhres Simplex "Red Arrow"; and Don McKee, Waco.

Pilots and planes in "C" group included: Tommy Fowler. Richfield Fokker F-10; D W Tomlinson, Maddux Ford, Waldo Waterman Bach transport entered by Los Angeles Metropolitan Airport, C. F. Lienesch, in a Union Oil Company Travel Air, Bob Larson, Bellanca Pacemaker, Lieut Paul Richter, Jr., flying the Fokker Super-Universal entered by Standard Air Lines and J B Alexander, Wasp Fairchild. The Richfield plane carried prominent tour officials, the Ford carried the "gentlemen of the press," the Bach carried local dignitaries from town to town, and the Standard Air Lines Fokker was official American Legion Plane for the tour

Other pilots and planes in the tour, flying in 'A' group were as follows J. C. Newsom, Jr., Kari-Keen Coupe Robert LeRoy, Axelson Travel Air Lee Brusse, Kinner Kreutzer; W B Kinner, Fleet; C A Burrows, Kinner Curtiss Robin; W. E. Carey Travel Air and group leader; W A Williams, Whirlwind J6-5 Eaglerock, Florence Lowe Barnes, Travel Air, Margaret Perry, Spartan M. C "Bob' Loutt, Travel Air M B Galloway TP Swallow; E. B Q Henriques, Curtiss Robin, Rufus Pilcher, assistant group leader, Stearman, Earle Ovington, Roam-Air; J. B Hinchey, Monoprep; Lindsey Gillis, Aeromarine-Klemm, Dr. H M. Hawkins, Barling NB-3, Larry Cooper, Great Lakes; Don Lusconbe, Monocoach Joe Davidson Consolidated PT-3. W B Hawkins, Great Lakes; M. W. Casey and Ray Moore Pitcairn Casserly, Pitcairn, and Jay Fetters, Gipsy Moth.

In addition the following planes were flown on the tour: Art Goebel, Taperwing Waco; Dudley Steele, Stearman Lee Schoenhair Goodrich Lockheed- Ray Hazen, Stearman and Bill Monday, Ryan all of these pilots having various duties assigned which prevented them from flying in group formations

Test Johnson Helicopter

MILWAUKEE (WIS.)—Air tests of the Johnson helicopter, a Hamilton plane with conventional nose power plant but also fitted with a propeller in horizontal plane beneath each wing, were held recently at the Milwaukee County Airport J. C Johnson, inventor, called the trials '90 per cent perfect" With the plane in the air and nose engine on at half power Pilot Victor Allison started the two wing propellers and the plane climbed quite steeply.

S-55 Completes Trip to Coast

PORT WASHINGTON (L. I.)—A tour of the United States Cuba, and Mexico has been completed by the Savoia-Marchetti S-55 fourteen-passenger seaplane which left here Sept 21. Wilham B Atwater and E. K Jaquith piloted the craft The last hop was one of 750 mi from Guaymas, Mexico to Long Beach, Calif from where it will go to its purchaser.

BRIEFLY

Farman Aircraft Corporation has been granted a charter in Dover, Del, with 100 shares of no par value stock It will have exclusive rights to manufacture Farman planes in the United States.

The tentative figures announced by the Budget Bureau indicate a cut of $10,000,000 in the allowances made for the Air Corps, Naval Bureau of Aeronautics and Post Office Departments, as compared with the amounts asked.

The major part of the work on the new Pratt & Whitney plant at East Hartford, Conn., is expected to be completed Dec. 15.

Northwest Airways, Inc., has moved into its own hangar at Wold Chamberlain Field, Minneapolis, Minn

Western Air Express and Midcontinent Air Express now operate radio stations at Los Angeles Kingman and Holbrook, Ariz., El Paso, Tex Oakland Calif., Las Vegas, Nev., Cheyenne Wyo., Denver, Colorado Springs and Pueblo, Colo

Western Air Express has ordered six new Fokker F-14 planes designed to carry a pay load of 1 600 lb. with accommodations for six passengers.

Hangar Club has been formed in Montreal as a social organization for persons interested in aviation, with Capt. F. G. M Sparks as president.

Axelson Machine Company, Walsh and Oak Hill Ave., St Louis, of which R M Pease is manager, is erecting a 30 by 50 ft addition to its plant to be used for repairing and overhauling of aircraft engines.

Red Bird Aircraft Company is planning the establishment of a factory at Hiawatha, Kan.

Bird Wing Commercial Aircraft Company, St. Joseph, Mo., of which Carl Wolfley is manager, is having plans prepared for a $50,000 plant.

Initial tests of the "Cadet," a one-place, open cockpit biplane, powered with a 60 hp LeBlond engine, were recently held at Wichita, Kan., by the Wichita Airplane Manufacturing Company. The craft is 18 ft. 3 in in length, with a wing spread of 24 ft It has a gas capacity of 19 gal.

Saul Aircraft Corporation, Carroll, Iowa, is soon to test a tri-engined four passenger cabin monoplane, the "Triad," Work on the plane was started about five months ago under the supervision of Glen C. Boyer.

Davis Aircraft Corporation, Richmond, Ind., is now offering a new model of its high-wing open cockpit monoplane The new plane known as the D1-K carries the 100 hp Kinner engine rather than the 60 hp LeBlond used in the V-3 model

Interstate Air Lines, Inc., will celebrate its first year of operation as an air mail contractor on Dec. 1.

Moth Aircraft Company, Lowell, Mass., is maintaining an output of eight planes weekly.

Rearwin Airplanes, Inc., and Inland Aviation Corporation have leased the building erected at Fairfax Airport by National Air Industries Each concern will operate independently of the other

The Board of Directors of the National Air Races and Aeronautical Exposition was to hold its first meeting since the event, at Cleveland, Nov. 15. A permanent organization and disposition of the $100 000 profits of the event are to be considered

Production will start on the Eastman Flying Boat at Detroit in a few days.

Pilot Radio & Tube Corporation, manufacturer of radio parts, Brooklyn, N. Y., has bought a new Stinson for use as a flying radio laboratory and broadcasting studio

Capt Lowell T Smith leader of the Army world flight in 1924, has received the Distinguished Service Cross for carrying out with Lieut. J. P. Richter, a refueling flight in August 1923

Creditors of the bankrupt General Airplanes Corporation Buffalo, N. Y. called a meeting to consider settlement of the claims against the company, at Buffalo, on Nov 11.

Multiple disc wheel brakes are now standard equipment on Sikorsky model S-38 amphibions.

Following the laying of the ring of the ZRS-4 at Akron, Ohio, Nov. 7, Admiral Moffett presented the medal of the Ligue des Aviateurs Internationale to Lieut Comdr Rosendahl, of the Navy Airship "Los Angeles" The medal one of the highest awards coming from a group representing 31 nations, was for meritorious service in operating the 'Shenandoah" and the "Los Angeles" Last year the medal went to Colonel Lindbergh

A Bellanca Pacemaker has been shipped to Franco Mazzotti, of Milan Italy He is a son of the owner of the Isotta Fraschini Motor Company

Gasoline shipped into Florida to be used in interstate aviation, is not subject to a state sales tax, it has been ruled by the state's attorney general

Proposed bond issues for the erection of municipal airports were rejected by Lima, Ohio, and Newark, Ohio, at Nov. 5 elections

Development of airports and airways in Oklahoma will be one of the chief features of the annual meeting of the Oklahoma Municipal League at Cushing Okla. Nov 26.

The MacAlpine party, which has been lost since Sept 8 on a flight to the Canadian Northwest was heard from on Nov 4 The party was forced to land near Hudson Bay because of severe weather

An aerial map is being made of Clatsop County, Ore., for the Oregon Forest Fire Association to determine the progress of reproduction of burned-over forest lands A Rankin Flying Service plane is being used

Fire hazards of the airport and landing fields are dealt with in a new booklet published by the American-LaFrance & Foamite Corporation, Elmira, N. Y.

The Richfield Oil Company is now servicing five major air transportation companies throughout the West. It has 28 terminals for aviation gas in nine states

AERONAUTICAL CALENDAR

Nov 9-17	Western Aircraft Show, Los Angeles
Nov 12	Lehigh Airport Design Competition Closes Lehigh Portland Cement Company
Nov 25	Hearing on proposed Southwestern Transcontinental Air Mail Route, Washington D. C.
Dec 9-14	Baltimore-Washington Aircraft Show, Baltimore, Md
Dec 10-16	National Aviation Week, Mexico, including air show and air display at Mexico City.
Dec. 16	Regional Airport Conference for New England Bridgeport, Conn
Jan. 13, 1930	S.A.E. Aeronautic Meeting Miami, Fla.
Jan. 21	S.A.E. Annual Meeting Detroit, Mich
Feb. 5-12	New York Aviation Show, auspices Aviators Post, American Legion
Feb 6-15	Cincinnati, Ohio Aircraft Show
Feb. 15-25	International Aircraft Exposition, St. Louis Mo.
Mar 6-15	Second Annual Pittsburgh Aircraft Show, Motor Square Garden Brown Boulevard Pittsburgh, Pa. Office in Aero Club, Pittsburgh, William Penn Hotel.
April 5-13	All-American Aircraft Show Detroit.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor Dealers Section Aeronautical Chamber of Commerce, at Madison Square Garden New York City

AIR MEETS

Nov 16-17	Hadley Field New Brunswick, N. J.
Jan 13-15	All American Air Meet, Miami, Fla.

AIRPORT DEDICATIONS

Nov 26	Ware County Airport, Waycross Ga.
Dec 4-5	Roswell N M. Airport.

TRADE TIPS

It has been reported that

Curtiss-Wright Flying Service, Jacksonville, Fla., is negotiating for a site for an airport and seaplane base in South Jacksonville

Clarksville Aviation Corporation, Clarksville, Tenn, is receiving bids for construction of an 80x100 ft hangar.

Buckley Aircraft Company, 237 N Water St, Wichita, Kan., is taking bids for erection of a hangar 63x102 ft. with basement

Drew Field, Tampa, Fla., will be lighted at a cost of about $12,000 R Wallace Davis, superintendent of public works, will receive bids after Nov 25

R N Binnicker and J A Griffin, Tampa, Fla, are to represent commercial interests in the selection of an airport site near that city which will be improved by the expenditure of about $750 000

Meriden, Conn, municipal airport commission will spend $78 358 during 1930 for improvement of the field.

Detroit, Mich., city airport will let a contract this month for lighting the field.

PERSONNEL

ELMER JAEGER has been named assistant passenger traffic agent at Houston, Tex., for Southern Air Transport.

IRA V. PACKARD has been made manager of Great Northern Aviation School at Coleraine, Minn.

W. L. MAHON, recently with General Motors Truck Company, has been appointed general sales manager of Curtiss-Wright Flying Service of Michigan.

A. E. MCMANUS, JR., recently with Culver City Airport, is now assistant to the president of St. Louis Aircraft Corporation.

J. C. SKOW has been appointed manager of Duluth, Minn., branch of Great Northern Aviation Corporation.

CHARLES FRAESCH has been promoted to the position of general service manager for Fokker Aircraft Corporation of America.

RODNEY H. JACKSON has been made operations manager of Wigwag Flying Service and pilot for Gen. Howard S. Borden.

LIEUT. ARTHUR GAVIN has resigned from the Naval Air Service to accept a commercial position. COMDR. E. E. WILSON, U.S.N., has also resigned to enter the commercial field.

STANLEY PARTRIDGE has been elected president of Mohawk Aircraft Corporation, recently reorganized as a Delaware corporation. RUFUS S. RAND, JR. is chairman of the board; GERALD P. MURPHY vice-president and general manager; A. S. TRUX, secretary and treasurer.

A. F. WINN is manager of a newly-created aviation oil sales department for Skelly Oil Company, Tulsa, Okla.

CLARENCE H. SCHILGHAUER has resigned from the Navy to become connected with the Aviation Division of General Motors.

L. F. MERRILL has been appointed chief engineer for the Axelson Aircraft Engine Company. At one time he was chief engineer for the Stout Engineering Laboratories at Dearborn, Mich.

WAYNE F. LANSING, formerly on the Braniff division, Universal Airlines has been appointed pilot on the Pan-American Airways staff.

CAPT. T. E. TILLINGHAST has been appointed executive engineer of the Pratt & Whitney Aircraft Company. He will assist in development and design work on the engines.

ARTHUR REINHART, former Dallas, Texas, street commissioner, has been named Southwestern sales manager for Curtiss-Wright.

CLARKE TRAVIS has been appointed instructor at the Jefferson Airways, Inc., school at Jefferson City, Mo.

PAUL P. MOZLEY has been appointed inspection and material engineer of Spartan Aircraft Company, Tulsa, Okla.

J. M. KNAPPENBERGER has been appointed general traffic manager of the Kansas City-Denver line of United States Airways. GEORGE HALSEY has been appointed manager of operations and F. C. WAHLENMAIER has been appointed division traffic manager at Denver.

LIEUT. HARVEY R. OGDEN has been appointed sales engineer for Curtiss Airplane & Motor Company at Garden City, L. I., for the duration of a two and a half months' leave.

MRS. EDITH FOLTZ, of Portland, Ore., has been appointed co-pilot on special charter trips of West Coast Air Transport.

L. H. SIMSON has been transferred from the radio station at Elko, Nev., to the new station on Rocky Butte near Portland, Ore.

A. E. MCMANUS, formerly associated with the Culver City Airport Corporation, Culver City, Calif., has been named the assistant to the president of the St. Louis Aircraft Corporation.

GRANT DU BOIS has been appointed general traffic manager of the Maddux northern division of Maddux Air Lines.

HERBERT KENDRED has been elected vice-president of the Air Travelers Insurance Company of Dallas.

PROF. CHARLES F. TAYLOR has been named head of the department of aeronautical engineering at the Massachusetts Institute of Technology.

CAPT. WILLIAM BRODERICK has been appointed chief flying instructor for the northern division of Great Northern Aviation Schools, Duluth, Minn.

R. D. BEDINGER has been appointed aeronautics branch inspector for the Detroit district, succeeding HOWARD F. ROUGH who has been named assistant chief inspector in Washington.

Representatives Named

NB-3—Dungan Airways, Inc., Cleveland, Ohio, for the state of Ohio.

DAVIS—McCray Air Services, Fairview, Pa., for Northwestern Pennsylvania. John D. Jacob, Malvern, Pa., for that immediate territory.

STUDENT PRINCE—Paul L. Burkhard, Associated Aircraft, Inc., Los Angeles, Calif., for the Southwest.

CARDINAL—Lamar Aviation Company, Lamar, Mo.

PRATT & WHITNEY—Stout Air Service, Inc., Cleveland, Ohio.

MADDUX—James Houlihan, Inc., advertising agency.

Ryan Testing Dope Mixtures

ROBERTSON (MO.)—To find the durability of various mixtures of dope, tests are being conducted at the Ryan Aircraft Corporation plant. Fifteen panels of airplane fabric covered with as many mixtures have been prepared and placed on the roof of the factory where the effects of the weather upon them will be observed. About half of these mixtures were prepared by paint and varnish companies, while the remainder were made up by the foreman of the dope shop.

Schools & Colleges

AIRTECH SCHOOL OF AVIATION has opened a branch at Palm Springs, Calif., with C. W. Seaton in charge of operations. An airport is under construction.

OMAHA AIRWAYS, INC., Omaha, Neb., has announced plans for opening a school at Red Oak, Ia.

PENNSYLVANIA STATE COLLEGE has developed a three-year course in aeronautics to be given in its branch schools in the state, and a home study course to be given by mail.

UNIVERSITY OF FLORIDA, in co-operation with McMullen Flying School, Tampa, Fla., will give a ground school lecture course.

ASSOCIATED AIRCRAFT, INC., Los Angeles, Calif., gives a standard transport pilot's ground course to all students, regardless of the license for which they intend to apply.

PARKS AIR COLLEGE has acquired a three-engined Ford and two Ryan B-3 monoplanes for student instruction. Instructors at the school are being equipped with uniforms.

BROADWAY HIGH SCHOOL, Glendale, Calif., has 100 students taking a course in ground work and aviation engineering at Curtiss-Grand Central Air Terminal, under the direction of Prof. Morgen N. Smith.

New Firms Announced

BARLING AIRCRAFT, INC., St. Joseph, Mo., capital $100,000, by W. H. Barling and Hayden S. Campbell.

THE SPACKMAN FLYING SERVICE, LTD., Oakland, Calif.; capital $300,000 by Marvin B. Sherwin, James L. Case and Fred Spockman, to engage in the manufacture and sale of airplane equipment, conduct a flying school, and operate machine shops and an airport.

DUPLEX MOTORS, INC., Everett, Mass.; capital 12,000 shares no par value stock, by Charles H. Messinger, Andrew J. Lloyd and Walter White; to deal in airplanes, automobiles, engines for both and accessories.

JUNE QUINN AIRCRAFT CORPORATION, Kansas City, Mo.; capital $15,000, by June Quinn, Tex LaGrone and Wiun M. Campbell to manufacture, repair and operate airplanes, manufacture and deal in parts and accessories, and operate flying fields and schools.

MARITIME AIRWAYS COMPANY, Halifax, Nova Scotia, subsidiary of the Aviation Corporation of Canada, to operate flying service in the Maritime Provinces.

General Instrument Buys Firm

MERIDEN (CONN.)—The General Instrument Company of Chicago has purchased the Connecticut Telephone & Electric Company here and will continue operations. Aviation and automobile accessories will be manufactured in addition to telephone, signal, radio and ignition equipment.

AIRPORTS AND AIRLINES

Rejects Proposed Air Mail Formula

WASHINGTON (D. C.)—An air mail formula expected to solve the rate controversy between the contractors and the Post Office Department was worked out recently only to be rejected by Postmaster General Brown. A new formula is to be devised without the direct co-operation of the air mail contractors. The contracts held by Colonial, Robertson, N.A.T., Western Air Express and Walter T. Varney automatically expired Nov. 6, but the operators are reported not apprehensive over this as the Postmaster General has the power to extend those contracts for six months.

Negotiations for the formula have now been going on seven weeks. Many operators express themselves as being willing to accept any kind of a formula, in order to get away from Washington and back to their businesses. In connection with the contract renewals it is likely that the question of the fate of the short hops will be opened up. Mr. Brown is understood to have been in favor of eliminating them, but it is believed that after consideration of the protests of the companies which pioneered on them he is now inclined to fit them into his economy program by asking Congress for permission to lengthen them some 400 or 500 mi.

Suggestions have been made that the present system of contracting for air mail be discontinued in favor of a plan such as is used by the Post Office Department with the railroads. Such a step does not appear to be the intention of the Department for some time to come, however. There does not seem to be much foundation for the rumor that the formula would fix the rates in such a way that a uniform return on invested capital would be provided all contractors. Such a procedure might remove any incentive to progress and expansion.

Air and Water Ferries to Oakland

SAN FRANCISCO (CALIF.)—Permission to operate a speed boat service across San Francisco Bay between the Ferry Building here and the Oakland Municipal Airport has been granted Fahy & McNulty. One way fare will be $1.25 and round-trip $2.00. Curtiss-Wright Flying Service expects to start an aerial ferry service between this city and Oakland about Dec 1. The Oakland Airport and a landing area at China basin in this city will be the terminals. The speed-boat will make five round-trips daily and the amphibion will be operated twice daily.

Grand Central Gets Restaurant

GLENDALE (CALIF.) — Furnishings and equipment for a restaurant and soda fountain are being installed at the Curtiss-Grand Central Air Terminal by The Interstate Company, a nation-wide organization operating more than 500 restaurants. The same company operates dining rooms and hotel at the Oakland municipal airport. The installation here will cost about $50,000.

New Type Wind Cone is Developed

WASHINGTON (D. C.)—A greatly improved type of illuminated wind cone has been developed by Airways Division engineers under supervision of Capt. F. C. Hingsburg. It differs from the present standard type in that the lamp is mounted on the axis of rotation in a fixed position and a parabolic reflector attached to the ring of the cone about the lamp revolves about the lamp instead of having the lamp revolve. Power in the latter case is supplied through a slip ring.

The combination of 150-watt 115-volt clear incandescent lamp and a parabolic reflector 10 in. in diameter having a focul length of 2½ in. has been chosen. This provides a brightness of 6.3 candles per square foot at the larger end of the cone and 1 candle per square foot at the smaller end as compared with a brightness of 8.4 candles per square foot at the large end and 0.05 candles per square foot at the smaller end in the case of the present type. The sock used in the new cone is 94 in. long, 18 in. in maximum diameter and 8 in. in minimum diameter.

For low voltage installations a combination of a 50 c.p., 32 or 12-volt bayonet base lamp and a parabolic auto mobile headlight reflector has been selected. This gives a brightness of 1.26 candles per square foot at the large end and 0.33 candles per square foot at the smaller end. While this does not give the brightness of the larger units at the large end, it averages brighter for about two-thirds of the remaining length.

Omaha Lights Operated

OMAHA (NEB.)—Newly installed lighting equipment was turned on for the first time Nov. 4 at the municipal airport here, on the opening day of a Jubilee and air circus. In addition to a 1,000-cp. rotating beacon, the port now has a bank of six 5,000-watt floodlights, ground lights mounted on metal pyramids, red boundary lights and a ceiling light. Bert LeBron was electrical contractor for the installation.

Federal Committees Will Test Sprinklers

WASHINGTON (D. C.)—Following up the long drawn out controversy over the need for and general desirability of automatic sprinkler installation in hangars, two Federal committees have arranged to make practical tests under actual fire conditions. The two committees are the National Committee on Wood Utilization of the Department of Commerce and what is known as the Fact-Finding Committee on Automatic Sprinkler Protection for Airplane Hangars. This latter committee has been organized by the Department of Commerce, also, and its chairman is Col. Harry H. Blee, chief of the Airports and Information Division of the Aeronautics Branch of the Department of Commerce.

A 55 x 80-ft. hauger of wood with concrete foundation and floor will be built at the Bureau of Standards plant and the tests will start upon its completion within about six weeks. Four types of fires will be observed: (1) Fire from exterior source; (2) fire starting inside wing due to faulty wiring; (3) fire starting in fuselage due to gasoline leak; and (4) fire starting from gasoline on floor from leaky connections. The Bureau of Standards is furnishing instruments to make adequate records of these tests, which will include test of the wet-pipe and dry pipe systems and also of the open sprinkler system with automatically controlled water supply operated by thermostatic devices.

Three Conferences Held

There have been three conferences on the subject of airport sprinkler installations at the request of the National Board of Fire Underwriters. The code proposed by that Board for the construction and protection of airports has been objected to strenuously by the aircraft industry and the Board has agreed to postpone the promulgation of the code pending the outcome of a series of tests.

The Fact-Finding Committee includes besides Colonel Blee the following: W. S. Garland, Bureau of Aeronautics, Navy Department; R. W. Hendricks, Underwriters' Laboratories; Ira G. Hoagland, National Automatic Sprinkler Association; Maj. Frank M. Kennedy, Air Corps; W. Laurence Le Page, Aeronautical Chamber of Commerce of America; Nolan D. Mitchell, Bureau of Standards; H. E. Newell, National Board of Fire Underwriters; Starr Truscott, National Advisory Committee for Aeronautics.

Similar tests were arranged for at the Middletown (Pa.) Air Depot during the late summer but were abandoned and a test has been announced for Nov. 20 at the Newark Airport.

St. Louis Runway Experiment Described

ST. LOUIS (MO.)—Some of the experimentation done on the "sample" hard surfaced runway at the St. Louis Municipal Airport was described in a paper read by Mark R. Thompson, bituminous paving engineer, at the annual asphalt paving conference at West Baden Springs, Ind., Oct. 31. The installation of the runway was preceded by a laboratory examination of 40 combinations of earth, metal and bituminous products. Briquettes 4 in. wide and 2 in. thick were made of these combinations and kept under a compression of 200 lb. per square inch for four days. At the end of that time they were broken and examined.

A mixture of about equal parts of soil and stone with the asphaltic materials was found to be the most economical for the results desired and also provided the most stable pavement. As for the asphalt used, the best results in the laboratory were obtained with a heavy cut-back and a light road oil. Past experience showed that this heavy material would be difficult to work and provide a uniform pavement. The next best material was found to be a road oil having about 60 per cent asphaltic content with a specific viscosity of between 20 and 50 and a cut-back with 70 per cent asphaltic content which is used for general surface treatment. Working conditions at the airport later substantiated this choice of materials.

Other Results Shown

Beside the choice of materials three other facts were brought out: (1) that the soil should be primed with road oil and mixed thoroughly; (2) that the soil should be spread, then a layer of stone added and then an asphaltic layer to the stone, (3) that sufficient materials should be used to have equal proportions of stone and soil.

In order to judge the proper working conditions and verify the results obtained in the laboratory, three stations 16 x 100 ft. were worked with the following materials: (1) Three applications of 0.5 gal. each of the cut-back were made directly to the pulverized earth and worked in by the use of the disk and harrow followed by the blade grader. The cut-back asphalt had the tendency to become "gummy" in spots and it was very hard to work to a uniform mix, so much so in fact that the volatile matter had evaporated by the time a uniform mixture was obtained and the mixture had set. Road oil was later added before the stone and asphaltic mixture was mixed for the finished pavement.

The asphaltic mixture (2) composed of two parts cut-back (70 per cent asphalt) and one part 60 per cent asphaltic road oil, was applied 0.5 gal. per sq. yd. and the results obtained agreed with the laboratory results and worked out satisfactorily. This combination was used principally throughout the runway except when the proportions were changed to three parts cut-back and one part road oil as conditions required.

There still existed the opinion that if cut-back asphalt (3) containing about 75 per cent 150 to 200 penetration asphalt having a solvent which would easily penetrate the earth and mix readily and would not dry or cure too quickly was available, a pavement would result which would be mealy and plastic rather than tightly bound and adhesive. With this view in mind an asphaltic mixture of the following analysis was used:

Specific gravity @ 60° F		969
Specific viscosity (Engler) @ 122° F		55.4
Viscosity (Furol)	104° F	405
Viscosity (Furol)	122° F	206
Viscosity (Furol)	140° F	119
Flash point		215° F
Distillation by A.S.T.M. method		D-20, 28-T
Percentage off	510° F	4.6
Percentage off	600° F	13.4
Percentage off	650° F	17.9
Residue after distillation:		
Viscosity (Furol)	400° F	13
Viscosity (Furol)	350° F	17

The results obtained with this product were so satisfactory that it was included as an alternate specification for the bituminous mixture of cut-back and road oil in the two sections of experimental runways which were let under contract.

One section of runway was made with tar as follows: the base sealed with Tarvia A followed by stone which was rolled into earth. After another ½ in. of stone and application of Tarvia B Special, which was claimed to give best results for this purpose, enough earth to fill the voids was brought in with the blade and rolled. Then followed the third application of stone, tar and earth. The pavement was built one layer upon another without mixing to a homogeneous mass. After the final application of tar the maintainer was used to thoroughly mix the top layer of material and then final rolling.

The quantity of material used in each section of the runway was:

Section	Road Oil, Gallons	Cut-Back, Gallons	Total	Gallons per Sq. Yd.	Stone and Chats (Lb. per Sq. Yd.)
A	3 303	3 705	7.008	3.16	184
B	4 770	4,001	8.780	3.44	184
C	2 050	4 600	6 650	3 10	176
D	2 831	3,867	6.698	3 04	170
E	2 830	4 900	7 550	3 43	189
F	1 000	7 218	8 218	3 72	201

Area of each section 2,205 sq. yd.

Continental to Carry Mail Only

ST. LOUIS (MO.)—Effective Nov. 15 Continental Air Lines was to abandon passenger service and resume its former policy of concentration on mail only. The company is operating two services, one being the night mail run between Cleveland and Louisville and the other a day shuttle service between Cleveland and Akron. The night run leaves Cleveland at 2:45 a.m., arriving at Louisville at 6:15 a.m. The plane leaves Louisville at 6:00 p.m. and arrives in Cleveland at 11:30 p.m. The shuttle leaves Cleveland at 12:45 p.m. arriving at Akron at 1:10 p.m. It leaves there at 3:45 p.m. and arrives at Cleveland at 4:10 p.m.

Canada-England Air Service Discussed

OTTAWA, (ONT.)—Details of the projected trans-Atlantic air service between Canada and Great Britain were given out by the Aviation Branch of the Department of National Defence. The scheme, which calls for an elaborate outlay of airports and radio beacons from Winnipeg to Baker Lake and from Baker Lake to Cape Dyer in Canada, is advanced by Warren School, consulting engineer from Chicago, but who is now staying in Winnipeg. From Cape Dyer it is planned that planes will fly to southern Greenland, along an airport chain, and from there to Iceland and the Faroe Islands and thence to Croydon, England.

The planes will be of all-metal construction and would be guided over the entire route by radio beacons which would eliminate all hazards from bad weather and fog. The planes would have a capacity of twenty passengers and a system of deferred express rates, something like the deferred cable rates, would be instituted to make up pay loads when the passenger quota was small.

It is estimated that the development cost, including establishment of all permanent airports and service facilities, would be about $23,500,000. There has been considerable discussion of the proposed service in England and both the Air Ministry and Imperial Airways are reported to have had it under consideration.

To Study Traffic Control

WASHINGTON (D. C.)—Consideration of the problem of proper control of arriving and departing air traffic at established airports has been desired for some time. The problem has now been placed in the hands of a special Research Committee appointed by Maj. Clarence M. Young, assistant secretary of commerce for aeronautics. The committee includes Charles H. Helms of the N.A.C.A., Lieut. Newton Longfellow, Air Corps, James Murray, Aeronautical Chamber of Commerce, Comdr. F. D. Wagner, Navy Bureau of Aeronautics; Col. Harry H. Blee, of the Aeronautics Branch; Capt. F. C. Hingsburg, Airways Division, Bureau of Lighthouses, Department of Commerce, Dr. J. Franklin Meyer, Bureau of Standards, and A. Pendleton Tahaferro, Jr., of the Field Service Section, Aeronautics Branch. The first meeting of the committee is scheduled for Nov. 18.

Halt Ship-to-Shore Services

NEW YORK (N. Y.)—Officials of the North German Lloyd and French Line report that the ship-to-shore services operated by their companies have been suspended for the winter season. The last operation of the plane on the former line was an eastbound trip which left here Oct. 22 and on the French Lines the trip leaving here Oct. 15. Both companies expect to resume service in the early Spring.

AIRPORT CONSTRUCTION PROJECTS

South

CONSTRUCTION of an administration building and a concrete apron in front of hangars are improvements slated for Meacham Field, Fort Worth's municipal airport. The improvements will be financed by the sale of $150,000 worth of the $500,000 in bonds authorized at a municipal election for airport improvements. The apron will be completed within two weeks. It will be of reinforced concrete slabs and will be 720x100 ft. A wire safety fence and a chemical fire truck are among other improvements being urged for the field, although they have not yet been authorized.

The Knoxville (Tenn.) City Council has appropriated $10,000 for grading Bearden Field, recently acquired for a municipal airport. The entire field will be leveled. Half of the field is being graded at a time, so that the other half may be used by planes. Grading will be completed by the first of the year.

The bond issue of Yuma, Ariz., amounting to $25,000, is to be sold at once, and the proceeds expended in development of a flying field, including construction of hangars.

Curtiss-Wright Flying Service has let the contract for construction of 127x143 ft. hangar and service depot at Oklahoma City to cost $120,000. Shop equipment, lathes, etc., will be installed.

The new $190,000 municipal hangar at Hatbox Field, Muskogee, Okla., is nearing completion under the direction of Joe Dickman.

J. Gilbert St. Julian, mayor of Lafayette, La., has completed purchase of 150 acres for an airport, and development is to begin at once.

Work is about completed on the construction of two runways, 3,500 ft. and the other 2,000 ft. long, and a drainage system, at the Asheville-Hendersonville, (N. C.) Municipal Airport. The lighting system is to be installed. Pocahontas Air Transport Company, of Bluefield, West Va., has a contract to operate the field.

Central

Maj. John Berry, Superintendent of the Cleveland Municipal Airport, has asked for $50,000 with which to build a 2,000x150 ft. runway, and complete a drainage system that would take care of the north end of the airport. The proposed runway would extend from a point in front of the Dungan Airways hangar, southwest across the field to the vicinity of the Ohio National Guard hangar. Should the city fail to appropriate this money, there is a possibility that it will be available from the $100,000 profits of the National Air Races.

Plans have been approved by the Lincoln (Neb.) City Council for a sanitary sewer to serve the municipal airport. The cost is estimated at $4,000 and will be paid from the Lincoln Airport fund.

Lincoln Airways and Lincoln Auto & Airplane School, 2415 O Street, Lincoln, Neb., has let the contract for one-story and basement 80x100 ft. hangar.

Stinson Aircraft Corporation has completed two new hangars on the Detroit-Wayne Industrial Airport, on which is located its new Wayne plant. The largest of the two hangars measures 68 x 78 ft. and will house the factory's service shop, while the smaller one, 50 x 50 ft., will be used as an auxiliary paint and dope shop.

The William Miller & Sons Company bid of $43,266 was the lowest received for construction of an automatic pumping system for removing water from Logan Field, Cincinnati. The pumping apparatus will work in connection with the drainage system.

Iowa City, Ia., last week sold $70,000 municipal airport bonds to White Phillips Company, Inc., Davenport, Ia., at $515 premium and accrued interest on a 4½ per cent basis. The City Council has authorized a committee to complete negotiations for the purchase of 191 acres of land, under option, for the port development.

The Enterprise Electric Company of Detroit has been awarded the contract to install, at a cost of $23,854, much of the lighting equipment at the Detroit Municipal Airport. The equipment includes complete boundary lighting, installation of switches and control panels.

Council Bluffs, Ia., following its vote to provide funds for a municipal airport by a one mill levy, is making plans for construction. The present field, owned by the Council Bluffs Aero Club, will be turned over to Rapid Aviation, Inc., in 1931, or before, if the new municipal field is ready at that time.

East

Clearing of the Hillsgrove, R. I., site for the state airport is about to be started by C. T. Kibbe, Inc., of Springfield, Mass., the contractor. This company bid $43,880. It also constructed the new Bowles Field project at Springfield, and is now working in the Pittsfield (Mass.) Airport. Black & Bigelow, Inc., of New York, prepared estimates on the Rhode Island project.

Universal Aviation has arranged for a 150x150 ft. hangar site at Newark (N. J.) Airport, in anticipation of the proposed Universal-Western Air Express transcontinental service. It is said a hangar costing between $150,000 and $180,000 is planned.

East Coast Aircraft will open its new service building and showrooms at the Boston Airport in a few weeks.

West

Irving Air Chute Company has begun the erection of $100,000 factory building at the Grand Central Air Terminal, Glendale, Calif., which will be under the direction of Guy Ball, and will have a capacity of 35 chutes per week.

The Aircraft Industries Ltd., has secured a tract at Boeing Field, Seattle, Wash., on which it will erect a repair shop and sales agency. This company will also establish branches in Salt Lake City and San Francisco.

The construction of a hangar has been started at the municipal airport in Okanogan, Wash., under supervision of A. L. Fox.

Contract for the new $100,000 hangar, now under construction at the St. Paul Municipal Airport for Northwest Airways, Inc., was let to Paul Steenberg of St. Paul.

Chicago-Atlanta Route To Have Beacons Soon

MURFREESBORO (TENN.)—Installation of beacon lights has been completed on the Chicago-Chattanooga portion of the Chicago-Atlanta air mail route, and will be completed in the near future. Night flying on the route is scheduled to start Dec. 1. If all the lights are not ready by that time, planes will probably be flown as far as Tennessee's Sky Harbor here, to remain until dawn. The spur line between Evansville, Ind., and St. Louis will also be flown at night.

In addition, radio stations are being installed between Chicago and Atlanta and at St. Louis for the Evansville run. The intermediate stations will be at Evansville, Greenville, Ky., at Tennessee's Sky Harbor, and at Chattanooga. Ground for the local station has been leased to the Department of Commerce by Interstate Airlines, Inc., owners of the airport and contractors for the Chicago-Atlanta air mail. It will probably be in operation by Feb. 1.

Denver's New Airport Well Equipped

SHOWING THE ADMINISTRATION building and municipal hangar, which were completed recently at Denver. The hangar is of metal

FOREIGN ACTIVITIES

Polish Air Lines Have High Record

WARSAW (POLAND)—In miles flown and passengers and baggage carried Polish airlines rank sixth in Europe, but in safety they rank among the highest. Since the first regular airlines were inaugurated in 1921 there has not been a single fatal accident and only very few accidents of any kind. Aviation on a commercial basis had a slow start in Poland but the quick communication afforded by air was an essential for the rewelding of the three separated Polands into one republic.

The airlines already in operation have been very successful and no small part of this success can be laid to the high degree of safety. The following table shows the operations of the three lines in Poland at the end of 1928:

	Aerolot	Aero	Cidna
Passengers	22,478	2,258	1,448
Mail (lb.)	86,330	1,283	14,809
Freight (lb.)	1,784,645	74,926	388,548
Flights	15,193	1,161	2,239
Miles flown	8,678,727	260,718	461,595

Aerolot and Aero were Polish companies, while Cidna is the French Compagnie Internationale de Navigation Aerienne. On Jan. 1, 1929, the two Polish companies were merged in the Lot company, in which 60 per cent of the capital is owned by the Polish government and 40 per cent by the cities served, such as Warsaw, Poznan and Lwow. Cidna operates but one line in Poland, from Warsaw through Breslau to Prague. Lot also operates one international line, from Warsaw through Katowice to Brno Czechoslovakia and Vienna. Cidna has projected the continuation of its Warsaw line to Moscow, while Lot has already entered into negotiations with Russian interests for a line from Warsaw through Wilno to Moscow.

Luft Hansa Important

Although not Polish, as it only flies over Polish territory, one of the most important airlines is that of the German Luft Hansa from Danzig, where connections can be made for any part of Western Europe as well as for the Baltic countries and Russia.

One of the most important developments in aviation in Poland is the recent conclusion of an agreement with Germany for the establishment next year of aerial communication between Warsaw and Berlin. The absence of a commercial treaty between Germany and Poland has been handicapping the foreign trade between these two countries, and this also has been one of the reasons that this very logical airline has not been put in operation. It is expected that air traffic between Berlin and Warsaw for all classes of service will prove very popular.

Statistics on the operation of Cidna in Poland for the first six months of 1929 are not available but the following table will show the operations of Lot:

Passengers carried	5,409
Mail carried (lb.)	31,235
Freight carried (lb.)	344,954
Flights	2,709
Miles flown	1,323,576

These figures show that the airlines in Poland are becoming increasingly popular. Warsaw is of course the center of traffic. By tram from Warsaw it requires 17 hr. to reach Vienna but by air only 5 hr. From Warsaw to Katowice or Poznan requires 8 hr. by train and only 2 hr. by air. To Lwow the journey by train, very monotonous through the Polish plains, requires 17 hr. but is reduced by air to only two and a half. At Vienna connections can be made with other European lines and at Danzig with Luft Hansa.

The Lot company has twenty planes in operation, fourteen Junkers F13 and six Fokker F7. Its landing fields are centrally located and served by special motor buses, except in Danzig and Warsaw, where both the fields are served by the city trolley car lines.

Panama Gets Airport Loan

PANAMA (PANAMA)—The Republic of Panama has recently contracted a loan of $140,000 to continue the improvement of landing area at the Panama Airport. Construction development is in charge of Eduardo Icaza. The David Airport has been completed and is the port of entry for all aircraft entering the republic from Central and North America.

Junkers G-38 Makes Successful First Flight

DESSAU (GERMANY)—Performance on its first test flight of half an hour indicates that the new Junkers G-38 will be entirely satisfactory. The plane has a wing span of 148 ft., overall length of 75 ft., and height of 16 ft. It is powered with four Junkers watercooled engines, two of 800 hp. each and two of 400 hp. each, all of which are carried inside the wings.

Passenger cabins, designed to accommodate about 40, are also in the wings, whose thickness is considerably greater than a man's height. The fuselage contains only pilots' cabin, navigating room, kitchen and freight room. The tremendous weight of the plane is supported by four extra large wheels in the landing gear, and a fifth wheel in place of tail skid. All five wheels are equipped with brakes.

England Disappointed Over Schneider Decision

LONDON (ENGLAND)—The announcement of the British Air Ministry that the government will not take part in the 1931 Schneider Trophy Contest or in any subsequent contests, as it considers it has done sufficient to prove the technical quality of British aircraft, has naturally created general disappointment in aircraft circles. The decision, in effect, presents the Trophy to any nation which likes to build better aircraft than those of 1929.

It is regarded here as a political decision and was made when Premier Ramsay Macdonald was on the high seas. He had stated soon after the race that Great Britain would defend the Trophy against all challengers. What it really amounts to is that the Air Ministry does not want the responsibility of defending the title. Also, the government found the organization of the race over the crowded waters of the Solent a very elaborate and expensive proposition.

The arguments advanced that sufficient technical information has now been gained and that there is no reason why private enterprise should not take over the task might all have been advanced after the 1927 contest with equal force. But Great Britain then would not have developed the Rolls Royce R engine, the highest powered single aero engine in the world, giving 2,000 hp. and capable of being turned into a very fine service engine at about 1,500-1,600 hp. It is a pure fallacy to say that private enterprise can compete successfully against a national entry, and the whole post war history of the race proves it. The United States first entered a government team and it remained supreme until it wearied and left the contest to private enterprise.

Italy, being governed by the enterprising Signor Mussolini, will probably seize the opportunity to go right ahead with preparations for 1931. In fact, General Balbo said she would, although it will be recalled that immediately after the race this year there were expressions from the Italian team intimating that Italy would not be able financially to participate in future Schneider events.

Publish Data on Subsidies

LONDON (ENGLAND)—Amount of subsidy for commercial aviation in six European countries has recently been published by the Air Ministry, as follows: England, $1,215,000; France, $4,505,220; Germany, $4,701,920; Italy, $2,533,051; Holland, $240,504; Poland $574,568.

Pilots and Navigators Form Guild in England

LONDON (ENGLAND)—Formal inauguration ceremonies marked the founding of The Guild of Air Pilots and Air Navigators of the British Empire on Oct. 19. The Guild, which has been in process of formation for some time, brings air pilotage and navigation into the class of "honorable and worthy professions" which are so organized throughout the Empire. Its purpose is to protect and advance the interests of commercial aviation by encouragement of high standards within the flying profession. The ceremonies were followed by a dinner at the Cecil Hotel, at which Lady Cobham was the hostess.

The Guild now has the following officers: The Master, Air Vice-Marshal Sir Sefton Brancker; The Deputy Master, Squadron Leader E. L. Johnston; The Wardens, A. S. Wilcockson, O. P. Jones, Capt. A. G. Lamplugh, Capt. N. Macmillan; The Members of the Court, F. Tymms, Capt. W. L. Hope, C. R. McMullin, L. A. Walters, F. Dismore, Flying Officer H. D. Davis, Flight Lieut. G. H. Allison, Flying Officer H. J. Horsey, Capt. J. B. Cordes, Lieut. Comdr. N. G. Atherstone, Flying Officer E. A. Jones, C. A. Pike; Honorary Members of the Court, Col. The Master of Sempill, Sir A. Whitten-Brown, the Rev. P. D. Robins; The Chaplain, The Rev. P. D. Robins; The Clerk, L. A. Wingfield.

Form Colombia Transport Firm

BOGOTA (COLOMBIA)—Compania de Rutas Aereas S.A., has been organized here to carry passengers, mail and freight between the principal cities of the country. Air mapping and photography will be included.

Junkers Plane Ten Years Old

BERLIN (GERMANY)—The "Nightingale" first Junkers plane of the F-13 series, has completed ten years of service, having made 2,543 flights covering about 187,500 mi. in 2,403 flying hours. It has been equipped with the following engines: Mercedes, Puma, B.M.W., Junkers L-2, B.M.W. 111, B.M.W. IV.

Farman Completing Tri-Engined Plane

PARIS (FRANCE)—A new tri-engined commercial plane is nearing completion at the Farman works. It is known as the Farman F.300, and is derived from the Farman 190 single engined monoplane. It is powered by three Gnome-Rhône-Titan 230 hp. engines, one being in the nose and the others in nacelles just under the wings, which are placed on top of the fuselage. They are trapezoidal in plan form, beyond the points where the struts are attached, the central section being rectangular.

The construction is wood with fabric covering. The fuselage is of the box type, comprising wooden frames and three-ply covering. A comfortable cabin for eight passengers is provided with sliding windows, curtains, luggage racks and heating system. A lavatory and space for cargo and mail are provided. The pilot's cockpit is in front of the cabin, it is totally enclosed, with opening windows. A wide tread axleless undercarriage is fitted with oleo pneumatic shock absorbers and wheel brakes.

Span 85 ft. 8 in., length 48 ft. 8 in., height 16 ft. 2 in., area, 753 sq. ft., weight empty 4,730 lb., load 3,836 lb. (including crew, 882 lb., fuel 1,518 lb. and pay load, 1,736 lb.). The total weight loaded is 8,569 lb. The anticipated performances are speed at ground level 124 m.p.h., ceiling 15,400 ft. The aspect ratio is 6.11.

K.L.M. Celebrates Tenth Anniversary

AMSTERDAM (HOLLAND)—K.L.M., "The Royal Air Traffic Company for the Netherlands and Colonies," was founded ten years ago this fall. It is one of the oldest air traffic firms in existence, but is still operating under the directorship of its chief organizer and manager, A. Plesman. The extent of its operations has increased steadily every year, and with minor exceptions, the extent of its volume of business has increased proportionally.

Founded with a contract by which the government guaranteed to pay two-thirds of all losses, the company received a new contract providing a straight subsidy in 1923, and another in 1927 which runs through 1933. Both of these latter contracts have provided, however, for a subvention diminishing in amount each year, so that the essentially private and commercial nature of the business is maintained. In 1927, the company was re-capitalized, and the total capitalization at present is approximately $500,000. The Dutch government holds about $200,000 worth of stock.

The oldest line operated by the company is between Amsterdam and London. In addition, service is offered to Bremen, Hamburg, Copenhagen, Brussels, Paris and Malmo, partly in cooperation with other lines. The company is also closely affiliated with K.N.I.L.M., "The Royal Netherlands Indian Air Traffic Company." Fokker planes are used exclusively by K.L.M., and 21 are now in service.

Efficiency of operation has increased steadily since 1922, as evidenced by the following table of average annual ton-kilometer costs: 1922, $1.90; 1923, $1.20; 1924, $0.89; 1925, $0.72; 1926, $0.56; 1927, $0.48. During the same period, the number of ton-kilometers flown annually increased from 163,000 to 1,273,000, or from about 101,875 ton-miles to about 795,000 ton-miles.

The number of miles flown has increased from 62,500 in 1920 to 1,014,413 in 1928. Number of passengers carried increased from 345 to 17,007, goods carried from 48,400 to 1,482,800 lb.; mail from 6,380 to 127,818 lb. In addition, the company has done a large business in special and sight-seeing rides as well as in aerial photography and other services. K.L.M. also operates restaurants and hotels at both the Schiphol airport near Amsterdam, and the Rotterdam municipal airport.

Name Mexican Entry Airports

MEXICO CITY (MEXICO)—The following airports have been designated as official airports of entry for this country: Matamoros and Nuevo Laredo, in the state of Tamaulipas, Piedras Negras in the state of Coahuila, Ciudad Juarez, Chihuahua, Nogales, Sonora, Mexicali and Tiajuana, Lower California, for the northern border; San Miguel de Cozumel, Progreso, Yucatan, for the Gulf Coast, and the town of Mariscal.

Zeppelin Hangars and Shops at Friedrichshafen

THIS IS THE HOME of the German airship industry and the birthplace of the Los Angeles, Graf Zeppelin and others of the famous line.

Koolhoven Delivers New Type to K.L.M.

THE HAGUE (HOLLAND)—Frederick Koolhoven has delivered to K L M a new type of plane, F K. 40 It is powered with one five cylinder air cooled Gnome Rhone Titan engine of 230 hp. It has dual controls a cabin accommodating five persons and a baggage hold The wing of this monoplane has an area of 107 sq ft and is of wooden construction with triplex cover Molybdenum welded tubes have been used for the construction of the fuselage, this material being used for the first time in Holland for plane construction The baggage hold can easily be transformed into a lavatory. The cockpit for two pilots is accessible from without as well as from the cabin. The landing gear is provided with the Koolhoven oil-brake system.

Its specifications are Cruising speed 100 m p h , top speed, 117 m p h , landing speed 56 m p h , empty weight with one pilot, 2,155 lb , with two pilots, 2,275 lb , load with one pilot, 2,025 lb ; with two pilots, 1,800 lb It has a gasoline capacity of 95 gal

Do.X and Junkers Diesel Costs Discussed

BERLIN (GERMANY) — Interesting facts were divulged recently at a meeting in Europe of the Scientific Society for Aviation Dr Claude Dornier estimated the cost of operation of the huge DO.X, at $ 50 per kilometer (.6213 mi) This is based on flying the plane at least 46 600 mi per year on trips averaging about 621 mi each.

Herr Garstadt, discussing the Junkers Diesel engine, declared that it requires 25 per cent less fuel than the ordinary engine, and increases the useful load by 50 per cent. He said the fuel and oil consumption is about 6½ oz per horsepower hour. This means a reduction in cost of about 28 per cent He made an interesting comparison between the machine of the Junkers Bremen type fitted with the Diesel and gasoline engines The latter, prepared for a flight of 3,700 mi , would be unable to carry any useful load in addition to its own fuel, while the former, with a Diesel engine, could carry nearly one ton

Japan Meetings Discuss Aviation

TOKYO (JAPAN)—Both the Engineering Congress and the Power Conference have devoted a fair share of their programs to aviation matters not only under definite sectional assignments for discussion but also in quite a few meetings on related subjects, such as engines, and communication The delegates saw the aeronautic research laboratory at Etchujima, near here, which is well equipped with a wind tunnel and other modern research devices. A glimpse of the airplane manufacturing industry and the air transport facilities in Japan, which are in early stages of development, also was afforded

Foreign News Briefs

On the night of Oct 26 Kurt Simon, piloting a Klemm Salmson plane D 1614 flew over Leipzig, Dessau and Schkeuditz, covering a distance of 1,060 mi in 19 hr The world's record for non-stop flights of light planes previously was 1 038 mi made by Herr Edzard

Monterey School of Civil Aviation has been opened at Monterey, Nuevo Leon, Mexico, under the direction of R. T. Richards

French aeronautical and postal authorities have under consideration plans for promotion of mail transport by air with a view to increasing the receipts of the French commercial airways companies

Anthony Fokker arrived on Oct 25 at Waalhaven aerodrome, Rotterdam, from London in a new Fokker 1X, bought by K L M He was accompanied by John Bracken, prime minister of Manitoba, and John Hunter, manager of Western Canada Airways Fokker expects to spend 2 mo in Holland England, France, Italy and Germany, visiting Fokker licensees and arranging for manufacture of Fokker planes in Germany.

Discussions between the Zeppelin Company, Friedrichshafen the officers and the crew have resulted in an increase of salaries and insurances as well as in improvement of hygienic conditions. Consequently, the Graf Zeppelin will definitely take off about April 1 for its cruise in the Arctic.

It is expected that the new hangar will be ready shortly and construction of the new Zeppelin Z 128 will be started forthwith

German air service between Berlin, Moscow and Leningrad, the Russian air services from Moskow to Irquisk and Baku and the services between Rotterdam and Prague and between Amsterdam and Mannheim were stopped Nov. 1.

The various air mail services in Persia operated by Junkers company, including the line to Baku, Russia, will not be discontinued this winter

The German pilot Espenlaub recently escaped without injury when the rocket plane with which he was experimenting at Dusseldorf caught fire and was destroyed

An airport has been completed at Acapulco, a Pacific Coast Mexican port, and another is planned at Sabinas Hidalgo, Nuevo Leon, Mexico.

A special $ 10 air mail stamp will be issued by the Mexican government in connection with Aviation Week, Dec 10-16.

Aerial photographs of French territory may be taken only by persons having a license issued by the Air Navigation Service, and it is the duty of the commander of an aircraft to take charge of cameras belonging to passengers during every trip

Luft Hansa plans to operate regular service to Oberammergau during the showing of the Passion Play in 1930

Col. Pablo L Sidar and Lieut Arnulfo Cortes have returned to Mexico City after completing a 20,000 mi good will flight through Central and South America.

Pan American Airways is considering establishment of a branch of its South American route from Arica, Chile, to La Paz, Bolivia.

Sir Hugh Trenchard, who will be the next Governor-General of New Zealand, has been Chief of the Air Staff for a number of years, and is the first member of the Royal Air Force to be appointed to such a position.

German insurance companies have refused to underwrite a policy covering the projected Polar flight of the Graf Zeppelin, so British and American companies may be approached

Dieudonne Costes and Maurice Bellonte have left Shanghai on their return journey to Paris.

A conference on the necessity for municipal airports was held in London Nov 5 under the auspices of The Royal Aeronautical Society.

Distance trials of the Dornier Do X will be made soon, but no Atlantic flight is planned before next spring

The French altitude record was broken recently by Leerivam in a Gourdou-Lescurre monoplane with 450 hp Gnome-Rhone Jupiter engine, attaining 37,700 ft.

As a result of the recent first international conference, held at Paris, dealing with all problems concerning use of gasoline in aircraft, a permanent technical bureau will be established at Paris

In Belgian Congo Sabena Company last year carried 1,992 passengers on its services between Leopoldville and Elisabethville (1,250 mi), Boma and Kongolo (1,400 mi) and Boma-Coquilhatville (630 mi), on all these services tri engined Handley Page planes being used Colonel Smeyers, chairman of Sabena, is at present inspecting the Congo services, further extension of which will be ready next year when total length of lines will be 3,750 mi

The tentative air mail flights, carried on by Luft Hansa between Berlin and Seville, Spain, are performed by an Arado plane, powered with Pratt & Whitney Hornet, built under license by the Bavarian Motor Works. The distance is covered in from 13 to 15 hr. With a view to the projected Germany-South American line tentative flights to Cape Verde Islands will be taken up as soon as endurance test flights of the Rohrbach Romar flying boats have been completed

National Flying Services' headquarters club at Hanworth had 534 members at the end of its first six weeks of operation The company has opened another club at Hull, at the new municipal airport there

THE BUYER'S LOG BOOK

Pease Blue Printing Machine

THE Model "30" blue-printing machine, recently introduced by the C F Pease Company, North Franklin Street, Chicago, Ill , is direct gear driven throughout, has a speed range of from 4 in. to 12 ft per min and is powered with a variable speed ¼ hp. motor direct connected to a fully enclosed gear reduction unit running in oil. At the extreme left hand side of the machine and mounted in the feed table is a special four-point auto-type gear shift providing for two forward speeds, high and low, also neutral and reverse. This reverse gear is an innovation in blue-printing machine construction and on the Model "30" it permits the operator to withdraw tracings or run back the leader roll whenever desired, without inconvenience. At the right of the machine and mounted above the feed table is another speed control in the form of a hand-operated dial connected by sprocket chain to a rheostat located beneath the feeding table This additional regulator permits instant change of printing speed to the proper degree to conform accurately with the character of tracings being printed.

After exposure, as the prints are carried over the top roll of the printing machine, they pass down to a specially designed atomized water wash consisting of spray jets directing a pressure spray of water over the entire front and back surface of the paper This method of washing insures thorough removal of all chemical and is much more effective than the ordinary flowing type of water wash used previously After washing the prints pass over in contact with a special 4 inch rubber covered roll set in a shallow pan at the bottom of the machine. This roll revolves in the same direction as the paper is travelling and coats the entire surface of the prints with a uniform application of potash solution. Negative solution is applied by this same roll in the same manner and interchange of solutions is a simple matter of feed tank adjustment without danger of dilution.

After the developing process with either solution, the prints are again washed by another spray jet arrangement This gives them a final cleansing and the roll of paper is carried over for drying

The dryer of the new Model "30" consists of two chromium plated copper drums and an auxiliary air drying unit These units are in graduated heat arrangement and because of the direct roll contact with the paper, prints are dried perfectly smooth and free from wrinkles

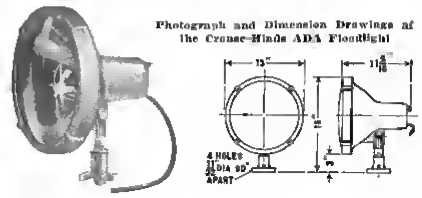
When especially thin paper is used, there is a special felt roller ironing attachment that insures perfect results This device is attached to the rear roll of the machine and is adjustable so that it can be either raised or lowered into operating position as required

The Model "30" is made in two sizes, 42 in and 54 in widths, either 110 or 220 volts DC or 220 volts AC. The 42 in machine is equipped with six lamps and the 54 in machine is equipped with seven lamps These lamps are of the special Type "P" enclosed arc style and consume either 6½ amperes on DC or 7½ amperes on AC when adjusted for their most effective printing speed

Crouse-Hinds ADA Floodlight

THE type ADA Floodlight has been put on the market recently by the Crouse-Hinds Company, Syracuse, N Y This light, built in a special cast aluminum alloy housing, has a reflector of crystal glass in smooth or hammered surface and an adjustable mounting The focusing mechanism is operated from outside the housing. The lamp receptacle is a porcelain medium screw base with the electrical outlet in the rear.

Plain diffusing or spread convex lenses can be furnished in clear, red, amber, green, purple or blue



Light distribution is variable from a narrow beam spotlight to a wide angle short range floodlight and the beam may be made either round or elliptical To eliminate spill light circular louvers may be obtained for fastening on the inside of the door

The lamps are 150 watt, Ps-25 bulb, 200-watt, Ps-30 bulb or 250 watt, G-30 bulb, the voltage of the lamp corresponding to the voltage of the circuit. The net weight is 10¼ lb and the shipping weight 14½ lb.

TRADE CATALOGS

ELECTRIC WIRING FITTINGS—The Crouse-Hinds Company has just issued a 280 page catalog describing condulets, groundulets, plugs, receptacles and other devices The condulets are made of "Feralloy," a special cast metal developed to meet exacting requirements and the result of research by their metallurgical department

DESIGN STANDARDS FOR OXWELDED STEEL AND WROUGHT IRON PIPING—The latest publication of the Linde Air Products Company is a 67 page booklet intended to enable the engineer and architect to design gas welded steel or wrought iron piping systems The booklet is illustrated by drawings and covers the necessary structural details

CANADIAN VICKERS, LIMITED—A 19 page catalog just published by Canadian Vickers, Limited, devotes a section to illustrations of aircraft under construction or recently built by them and describes briefly the scope of their aircraft building operations. The remainder of the booklet pictures some of their ship building activities and construction work of the structural steel and industrial departments

WHAT OUR *Readers Say*

Aviation and the Dictionary

TO THE EDITOR:

Your editorial in the October 12th issue of AVIATION, has been brought to my attention. Your views are more or less in harmony with mine, particularly where the technical terminology of aviation is concerned. For that reason, I am working in harmony with the National Advisory Committee for Aeronautics, have their publications, and shall make use of the material at the very earliest possible moment that I can.

When the terms *enplane* and *deplane* were brought to my attention, I considered them not as technical terms belonging to the science of aviation but as valuable additions to the speech of the plain people, exactly as the words *embark* and *debark* already are. And why not? Apart from this, if good usage sanctions better terminology, it will also find its place in the record. But let me point out to you that most technical specialists have axes to grind or interests at stake, and that if the language had waited until terminology had been approved by these gentlemen, the science of aviation would not be where it is today.

You know as well as I do that the genius of the language throws into the discard terms that are not in harmony with the public sense of the fitness of things, even as you also know that in aviation, as in radio, motion pictures, and other of our more modern sciences, cohorts of words have come, marched past, and have never been heard of again. That is one of the reasons why I have in my collection of terms here some 85,000 words that have been used at different times, all of which must be considered before we go to press with a new edition of our dictionary. We keep our vocabulary up to date as far as we are able, but you must bear in mind that the National Advisory Committee can not do any more than select from that which is submitted to it.

You invent some device, give it a name, and obtain a patent for it, and you stick to the name through thick and thin or you will lose your patent rights. Thus it was with *aluminum*, that some brilliant writer set about to correct because he did not like the form, and turned what Humphrey Davy called *aluminum* into what the English term *aluminium*. Our arms are open to the technical specialists at all times, but the technical specialist has very little to do with *enplaning* and *deplaning*. I shall be very glad to receive any terms that you may think good substitutes for these, but they must have been in use for some time.

What I said about *enplane* and *deplane* was based upon what was told me, as well as upon the fact that the terms had been in my files for some time. You speak of the existence of a standard aeronautical dictionary. Exactly what do you mean by this? I know of the publications of the National Advisory Committee, and I have them on my desk here. If you mean a work that differs from these, I shall be very glad to hear more about it. [The reference was to the N.A.C.A. report on nomenclature, to which Dr. Vizetelly also refers.—Ed.] Thank you for your editorial. Now, kind sir, please get after your technical specialists, but remember the maxim, "Too many cooks spoil the broth." That is what has already happened to the vocabularies of the other sciences.

Incidentally, let me ask you why you print *full sized* as a solid word? If this is the type of terminology that is to be made through aviation, I shall have to go through it with a great deal of care, for this is an indication that you may have coined many forms that are not recognized when measured by the standards of good usage.

FRANK H. VIZETELLY
Editor, Funk and Wagnalls New Standard Dictionary
Funk and Wagnalls Co.
New York City

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More Grass and Less Dust

TO THE EDITOR:

The following is a comment for the Reader's page in AVIATION.

The increase in the number and excellence of airports is commendable. While the field is under construction the seed should be sown in order to obtain a good standard grass at the earliest possible time.

A cloud of dust blown into the eyes of the aviation fans with every take-off is enough to dampen the enthusiasm of the most ardent fan. The soiled clothing of the fan as well as the airway passenger can react in but one way, and that unprofitable to the aerial transport company, and the industry as a whole. I have heard the local airport called the dirtiest place on Earth. Dirt roads could not last with the automobiles. Cinder strewing steam locomotives cannot object to loss of traffic to other forms of transportation.

For the airplane to cast cinders from its obsolete competitor into the eyes of its staunch supporters is too much. A flat expanse of earth or cinders on a hot sunny day may start heavenward a column of air of cyclonic proportions. The resultant down currents around it are not conducive to happy landings. Concrete runways can be added to a grass-sown field at any time.

M. S. HUCKLE,
158 Arlington St.,
Wollaston, Mass.

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The Statistical Issue

TO THE EDITOR:

I wish to congratulate you upon the October 5th issue of AVIATION.

It is the first time that I have seen data in statistics that amount to anything on the aircraft situation in the United States. The issue is full of most interesting figures, and I am sure will be appreciated by the industry at large.

I am glad to see that your publication is the first one to put out a comprehensive statistical number.

EDSEL FORD
Detroit

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Newspapers and Accidents

TO THE EDITOR:

The newspapers of our country have performed a real service for aviation during its short history. Even with flying as common as at present there are thousands for whom the daily papers furnish their only contact with aviation. How fortunate that these papers show enthusiasm in portraying with confidence this growing factor in our lives.

There is one phase of flying which of course causes us regret, and that concerns the accidents. However, aviation is here. It is inevitably destined to expand and figure in our daily lives far beyond our present comprehension. With this new accomplishment come certain perils, but they are not inherent ones. We must take the farsighted view of pioneers in a new and radical adventure. Airplane accidents are rather the severe lessons by which men are learning to conquer the air. Air accidents are news items and can hardly be excluded from the press. It is possible that they belong on the front page. But may I ask a question, in the interest of flying? Would it not be fair to off-set each depressing news item by equally important constructive news? For instance, recently the report of a fatal accident was front page news. On the second page was a report which was diametrically opposite and stimulating. It told of a passenger who took control of an airplane and brought it down safely without any previous instruction. That, if reported correctly, was remarkable and an indication that airplanes have inherent stability. Why not off-set each depressing news item with an encouraging news item? If depressing occurences must be published, why not give equal space and prominence to inspiring news?

As we have observed, the newspapers are heartily sponsoring aviation. Their attitude is friendly therefore I make the above suggestion. A conscious effort to balance the sad occurences with optimistic news would greatly increase the confidence of a certain class of people in flying. I do not refer to the "air-minded" people as they recognize that accidents cannot entirely be eliminated at this early stage in flying. However, there are thousands of "air-shy" people and they are decidedly influenced by the stories they read in the newspapers. In fact, that is their only contact with flying. The progress of commercial aviation depends upon the growing confidence of the whole nation in this new transportation means, whether for express, mail or passenger service.

If the newspapers could somehow balance each depressing incident by giving equal prominence to encouraging news, the "air-shy" people would receive a more favorable impression of aviation.

JETSON O. BENTLEY
Castle Point, N. Y.

Editorial Comment
FROM THE DAILY PRESS

Aristocrats of the Air

THE RECENT National Air Races were instructive as well as spectacular.

One of the most impressive things about them, however, was a thing that most of the spectators barely noticed.

Each day, while dozens of army and navy planes were performing hair-raising stunts in front of the crowded grandstands, with scores of other planes waiting, on the ground, for their turn to go up and make some new thrills, there was a steady stream of planes taking off and landing on a remote section of the airport, away from the crowds.

These planes came and went without making any fuss. Nobody gathered around to watch them. No excited spectators mobbed their pilots to ask for autographs. No photographers made life miserable for them with clicking cameras.

These planes weren't taking part in the great exhibition that had drawn the crowds. They were just the air-mail planes—leaving the airport, day and night, for distant points, just as they had been doing for months before.

They weren't in the show at all. Yet it is a question whether any part of that spectacular exhibition was quite as impressive as the sight of these airmail ships leaving and arriving on regular schedule, in a vacant field behind the place reserved for the dare-devils.

The races were a great show. Lindbergh, Williams, Doolittle and others did things with airplanes that were positively incredible. The finest pilots of the army, navy and marine corps went through complicated maneuvers with amazing skill. Three Canadian officers came down and made 50,000 spectators gasp with their consummate skill and daring.

All this was valuable. It surely proved that the biplane is a pretty reliable proposition, to say the least.

But the men who didn't get the applause—the airmail pilots—were, to our notion, the men who were really proving the airplane's worth.

Every hour of the day and night one or another was taking off on his regular round. One man would head east for the perilous climb over the Alleghenies. Another would point the nose of his plane for Buffalo and Albany. Another would swing south to the Ohio river valley, another would head west for Chicago, carrying a cargo that would be on the Pacific coast 36 hours later.

Every day and every night through the coming fall and winter these men will be doing the same thing. While we are safe in our homes, on bitter stormy nights, they will be soaring alone through the darkness to carry the mail. Once in a great while one of them will be killed. * * *

The airmail men, in short, and not the stunters, are the real aristocrats of the air. The big job isn't always done by the chap who gets the most glory.

ELGIN (ILL.) COURIER-NEWS.

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Overcoming Sky Barriers

WHILE the majestic Graf Zeppelin was anchored at her mast in her home port making ready for the flight across Russia and on to Tokyo, it was reported that the start was delayed because of the hesitation on the part of officials in Moscow in granting permission to the ship to enter the air over the Russian border. A similar delay was caused by French authorities a fortnight earlier when the craft was charting a course from Germany to the United States. In both instances the permission was granted, though not, apparently, as a matter of course and not without a faintly concealed desire, in each case, to exercise a degree of authority which, uncurbed, would have rendered difficult a performance which has won the applause of the people of the whole world.

In view of the rapid development of transportation and communication through the trackless channels of the air, one can but speculate as to how long any nation or group of nations will find it prudent or possible to maintain the imaginary aerial barriers which now theoretically separate them from their neighbors and from the rest of the world. It would seem that the time is coming, even if it is not now here, when there must be a revision of those codes of law which, despite their wise enactment, have naturally tended to perpetuate an artificial isolation or separation disadvantageous to peoples and nations whose interests, in the last analysis, are almost identical.

A writer in the current issue of the Journal of the American Law Association, Col. W. Jefferson Davis, of San Diego, Calif., advances the view that these new agencies will be effective in "furthering concord among the leading nations of the world, regardless of the wishes of statesmen who may be inclined to protect the barriers and jealousies of individual states as against agreement and comity among nations." Indeed, it would seem that there is no choice left to those who would seek to guard the theoretical boundaries against the passage of friendly aircraft, any more than in the case of the transmission across the borders of radiocast messages on their flight from capital to capital and thence around the world.

Of course, it is not possible that the rights and privileges of individual nations will be surrendered because of this overwhelming invasion of airships and communication lines. Until the time comes when all barriers can be removed, there will remain the theoretical need of recognizing and asserting national and state sovereignty. But with the advance of these newer methods the futility of attempting to maintain antiquated theories of isolation is apparent. Indeed the nation which would keep pace with world progress must while safeguarding its integrity, abandon those fictitious standards which it may sometime be realized have contributed a large share in perpetuating and fanning the flames of international discord and strife.

Those jurists and scholars who undertake the task of writing the new code of the air will enter a field where they must work without the aid of precedents afforded by ancient laws and adjudicated causes. In some European countries and in several of the American states laws have been enacted to regulate air transport. The larger question of transcontinental regulation is not so readily solved. Its logical solution will come with the

ungrudging co-operation of all governments in the formulation of a world code in which there is written a record of concessions made, rather than one of reservations insisted upon.
CHRISTIAN SCIENCE MONITOR.

* * *

Aviation Regulation

[While *Traffic World* is not "The Daily Press" the editorial reproduced below is specially interesting in its presentation of the attitude of other industries directly affected by the growth of air transport.]

IT WAS INEVITABLE, with the growth of commercial aviation, and especially with the increased participation by the railroads in enterprise furnishing this means of transportation in connection with the rails, that there should be agitation looking toward regulation—federal regulation in other respects than that of safety. This agitation appears in measures introduced in Congress, the debates thereon, and the writings and speeches of men whose interest, academic or otherwise, is in transportation. And, if there is to be regulation, should it be by the Interstate Commerce Commission or by some other agency?

Up to this time such regulation has been, for the most part, promotive rather than restrictive, and has been confined almost entirely to the safety phase. Now it is proposed to make the air transportation companies subject to some of the same sort of restriction and regulation that applies to the rail transportation companies. It seems obvious that, if there is to be such regulation, it should be by the Commission, which regulates the railroads and which should, in our opinion, have charge of the regulation of the motor vehicles and all other common carriers. The function of the Department of Commerce is to promote and encourage business and it very properly has been exercising that function with respect to aviation. But its function should not be extended, as some would have it, to include regulation of aviation any more than it should be to include regulation of the railroads.

As to just what regulation there should be—that is a proper subject for discussion. It seems, however, rather anomalous that railroad companies should be regulated as to their rail transportation, but, when a part of a certain transportation performance is by airplane—with the airplane transportation company owned or controlled by the railroad—they should not be regulated as to that part of the transaction. It would also seem inconsistent that, in so far as airplanes compete with trains, they should not be regulated, though the trains are regulated.

We hear a good deal in these early stages of the controversy to the effect that aviation is new and the business should not be stifled by regulation. That is an old and familiar cry, having been used much with respect to motor vehicles. But the motor bus operators themselves now favor regulation, state and interstate, and whether they favor it or not, there is no good reason for making fish of one form of transportation and flesh of another. So we believe aviation must and should accept the situation. However, there would seem to be no occasion to get greatly excited over it just now. Aviation is making rapid strides but, perhaps, it has not yet reached the point where regulation must be applied for its own sake, for the sake of the public, or in justice to its competitors.

There is one argument being used against regulation however, that we would suggest would better be left unused—speaking from the point of view of the aviation companies. That is, that if air transport companies are to be held subject to the same liability that applies to other common carriers, the business will be retarded, due to the financial burden it would have to carry. This argument is a denial that flying is safe—as safe as any other means of locomotion, when confined to "straight" flying, which means when "stunts" are not engaged in. Air transport men — though of course handicapped because of the youth of the business, in the ability to procure adequate actuarial figures—insist that flying is as safe as riding in a train, or a steamship, or an automobile. It may or may not be. But objection to the liability required of other common carriers is not a very good way to convince the public of that safety.
TRAFFIC WORLD.

New Volumes
FOR THE SHELVES

Navigation by the Moon

LUNAR EPHEMERIS FOR AVIATORS *(Aeronautical Supplement to the American Nautical Almanac), Prepared by the Ephemeris Department of the U S Naval Observatory embodying ideas suggested by Lieut Commdr P V H Weems, 1929, 131 pages*

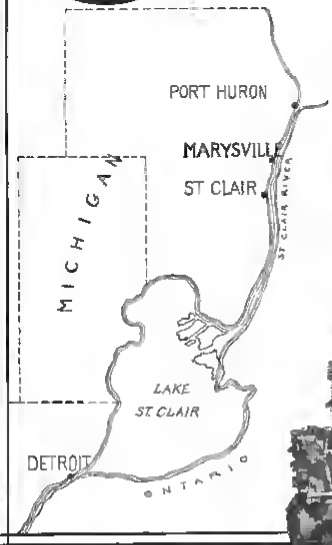
AS STATED in the preface this new publication is designed to enable a navigator quickly to reduce simultaneous observations of the sun and moon when locating by means of two position lines, and embodies ideas originally suggested by Commander Weems, U S Navy. The moon's position is given for every ten minutes of Greenwich Civil Time by means of the Greenwich Hour Angle (instead of the right ascension) and the Declination. By employing the Greenwich Hour Angle, the calculation of the moon's altitude is placed on nearly the same basis as that for the sun's altitude, and it does away with the necessity for considering the moon's right ascension and the sidereal time, resulting in a substantial reduction in the amount of calculation.

It is a decided advantage to be able to use simultaneous altitudes of sun and moon for a location by position lines. Star sights worked in the ordinary way require more calculation, the (twilight) interval during which they can be made is more limited and they are more difficult for many observers.

From the arrangement of the tables and the illustrative example given it is apparent that it is intended to limit the application of this ephemeris to sights taken at the instants for which the moon's position is tabulated, that is, every ten minutes of Greenwich Civil Time. This obviates the necessity for interpolation and, therefore, shortens the time required for the calculation. Considering the present limitations of the aerial sextant, this arrangement may give all the precision that is required, even if the sight is not taken exactly at this instant.

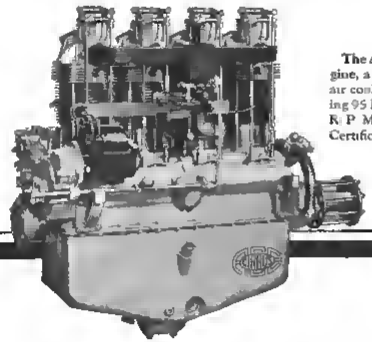
It may, however, be desirable or necessary to take the sights at other times and to work out the results with greater accuracy. In this event the amount of interpolation required in the present form of the ephemeris is rather large and the arrangement is not the most convenient. The variation per minute of time is given after each value of the Greenwich Hour Angle. This rarely changes more than 0′.01 or 0′.01 on a page. On page 9, for instance, it is either 14′.53 or 14′.54 for all values on that page. A better use of this space would seem to be to construct some form of auxiliary table giving "proportional parts" of these numbers. One possible arrangement would be to calculate the difference for each 10 seconds of time from 0ˢ to 10ˢ. This would enable the calculator to take out at once his correction for minutes and seconds (of time), within a minute or so of angle, and add it mentally to the tabulated hour angle. The numbers tabulated for hours and (10) minutes in the first column could also be made to serve for minutes and (10) seconds in stating this correction. The declinations of the moon given for every ten minutes of time have tabular differences of some 2′ to 3′ as a maximum. Admitting that for the purposes of aerial navigation, where speed rather than precision is the object sought, such tabular differences would be sufficiently small, then the precision of the Greenwich Hour Angle as found by the auxiliary table suggested would be sufficient without further interpolation.—GEORGE L. HOSMER.

EXPANSION!



OWING to the rapidly increasing demand for the American Cirrus engine, this Company has been forced to acquire a plant which would allow for its rapid expansion and enable the production schedules required to be met.

The new American Cirrus plant at Marysville, Michigan, is a factory with a total floor space of nearly 300,000 square feet, on a property comprising 150 acres with a river frontage of 3100 ft. It is situated in one of the greatest aviation centers of the United States, being only a few miles from Detroit, and is admirably suited for the production of aircraft engines. Here the company will be able to give its customers even greater service than ever before.



The American Cirrus Engine, a vertical four in line air cooled motor developing 95 horsepower at 2100 R P M Approved Type Certificate No 30.

CIRRUS

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MARYSVILLE, MICHIGAN

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***The Following Records of Importance were made while using* GULFPRIDE OIL *for* Lubrication of Motors**

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July 13th to July 30th, 1929—F. O'Brine and D. Jackson with Curtiss-Robin plane "St. Louis Robin." Time in air 420 hours 21 minutes. Powered with Curtiss Challenger Motor using GULFPRIDE OIL 120.

World's Altitude Record for Airplanes

May 8th, 1929—Lt. A. Soucek, U. S. N. with Wright Apache plane, Anacostia, D. C. Altitude 39,140 feet. Powered with Pratt & Whitney Wasp motor using GULFPRIDE OIL 120.

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June 4th, 1929—Lt. A. Soucek, U. S. N. Wright Apache plane—Anacostia, D. C. Altitude 38, 560 feet. Powered with Pratt & Whitney Wasp motor using GULFPRIDE OIL 120.

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(For Seaplanes and Flying Boats)

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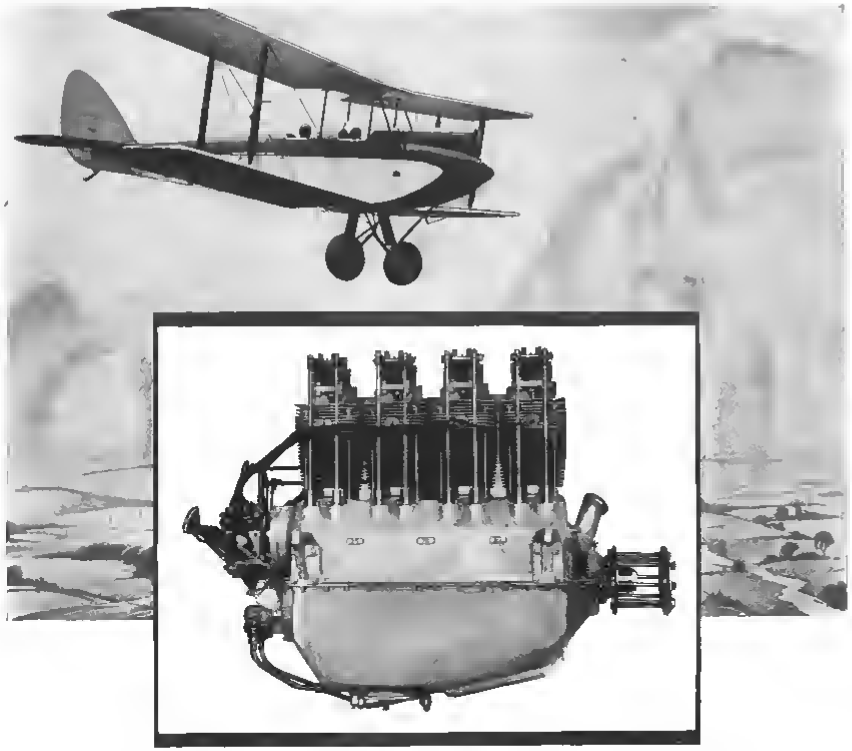

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The SRB Bearing containing the maximum number of largest possible balls which are hot-forged from Molybdenum steel is ideal for the propeller thrust position. It provides the greatest possible thrust capacity with a correspondingly high factor of safety.

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PACIFIC COAST DISTRIBUTORS—F. M. Cobbledick Co., *San Francisco, Cal.* E. D. Maltby Co., *Los Angeles, Cal.* Northwest Bearings Co., *Seattle, Wash.*

SIDELIGHTS

Planes of the Ford Reliability Tour lined up upon the apron in front of the Universal hangers at Lambert—St. Louis Airport, Anglum, Mo.

Within fifteen minutes after the wire for a cylinder casting and wrist pin was received the parts were packed and ready for shipment.

on the Ford Reliability Tour

A cracked cylinder on a motor of a plane flown in the Ford Reliability Tour forced the pilot down in Louisville, Ky. Spare parts were needed in a hurry and the pilot knew where he could get them.... Within fifteen minutes after the wire for parts was received by Universal, a new cylinder, piston and wrist pin were on the way.... That's the kind of service you are looking for. It is the kind of service you can expect here where stocks are complete and the desire to serve is paramount.

N-674

ALL AERONAUTICAL SUPPLIES
UNIVERSAL
AVIATION CORPORATION
ROBERTSON DIVISION
LAMBERT-ST. LOUIS AIRPORT, ANGLUM, MISSOURI

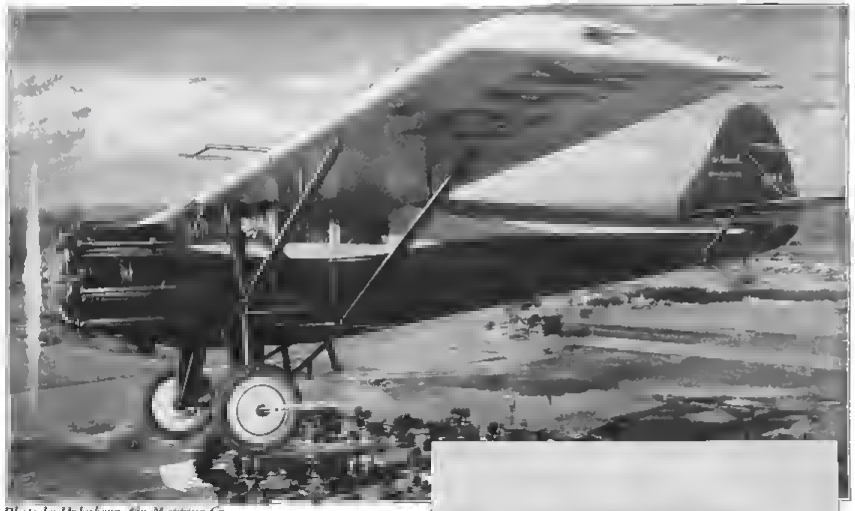


Photo by Holmberg Air Mapping Co

The *Monocoach*

WELCOMES COMPARISON

In performance—comfort—dependability—luxury and *VALUE*, the new Monocoach welcomes comparison with all other quality production aircraft. Nothing else will prove so conclusively—so decisively—the supremacy of this four passenger cabin plane.

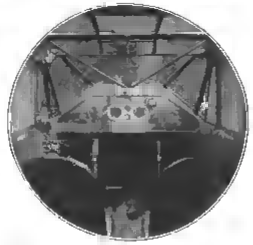
Altho designed and engineered especially to meet the growing demand of the private flyer for a family and guest plane, the Monocoach has proven itself invaluable for business and passenger service. Powered by the Wright W.W. J-6, it has an excess of reserve power and a speed of 133 miles per hour.

Is offered at about two-thirds the cost of the slightly larger cabin planes and approximately the same price as the conventional open three place biplanes, equipped with engines of less horsepower.

Price: $8,250 flyaway Moline, Ill.

Specifications and Performance Data

High wing monoplane	
4 place enclosed cabin	
Color	optional
Upholstery	mohair
Span	39 feet
Length	26 feet 8 in.
Height	7 feet 8 in.
Wing Area	222 sq. ft.
Weight—Empty	1919 pounds
Weight—Full Load	3092 pounds
Fuel Capacity	63 gallons
Engine	Wright W.W.J-6
Horsepower	225 h.p.
Landing Speed	48 M.P.H.
High Speed	132 M.P.H.
Cruising Speed	117 M.P.H.
Cruising Range	650 Miles
Ceiling	22,000 feet
Climb per minute	1 200 feet



Dual Control; Hamilton or Standard Steel Propeller; Eclipse Starter; Bendix wheels and brakes, Split type landing gear, Oildraulic shock struts; Navigation lights; Pioneer Compass and Air Speed Indicator; Thermo-Pete oil pre-heater, Consolidated Instrument Board

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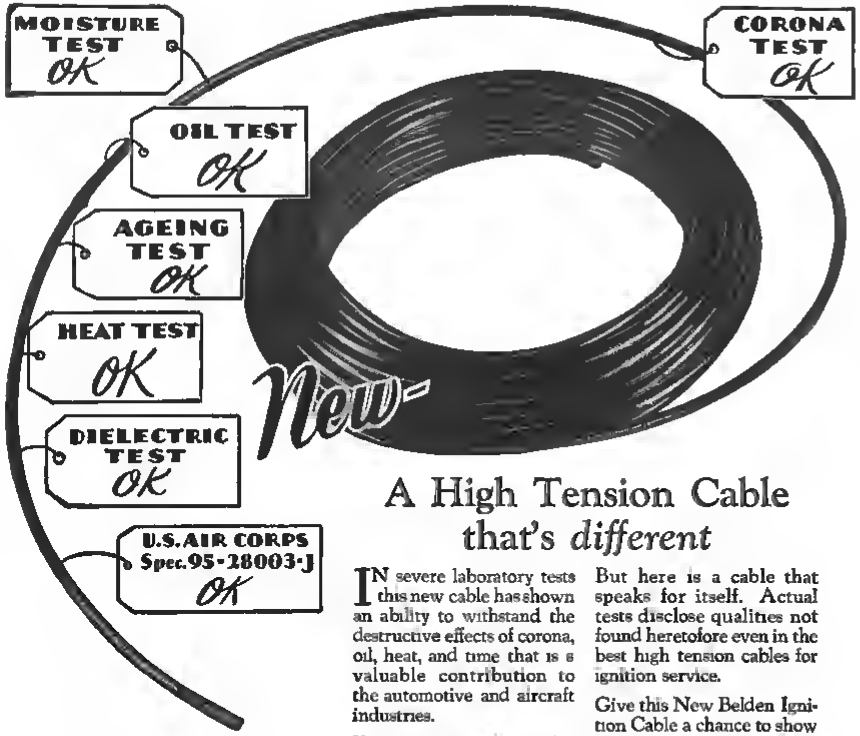

A High Tension Cable that's *different*

IN severe laboratory tests this new cable has shown an ability to withstand the destructive effects of corona, oil, heat, and time that is a valuable contribution to the automotive and aircraft industries.

Words cannot claim for this New Belden Ignition Cable attributes that have not already been claimed for high tension ignition cables now on the market.

But here is a cable that speaks for itself. Actual tests disclose qualities not found heretofore even in the best high tension cables for ignition service.

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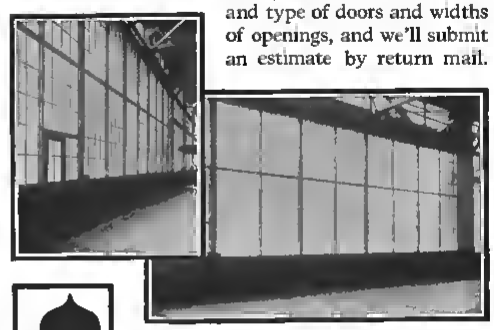
It's a husky little "locomotive" built to support and move the door along the floor rail. Built fool-proof and trouble-proof.

It is designed to fit the swivel opening in standard hangar doors, and each unit will handle up to 1000 sq. ft. on straight line or round-the-corner installations. Installed in a few hours, without tying up traffic.

Send us a blue print or give us the size and type of doors and widths of openings, and we'll submit an estimate by return mail.



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The complete landing gear unit consists of the new, improved *streamlined* "B" Series Gruss Air Struts complete with end fittings. This new service relieves your plant of a troublesome production problem. At the same time it places your landing gear problem in the hands of an organization of landing gear specialists.

A complete set of landing gear blue prints is all that is required by Gruss engineers. We suggest that you communicate with our Engineering Department for complete information concerning this new service developed for you by Gruss.

Pioneer Builders of High Grade Shock Absorbers

GRÜSS AIR STRUT

Manufactured by GRUSS AIR SPRING COMPANY OF AMERICA LTD
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This WACO "225" Straight-Wing won the Fifth National Air Tour with a perfect score for every lap. If you'd like further information regarding the ship and the Tour send for the two interesting booklets which give full details.

9-41

What it means to you...

that WACO *won the National Air Tour two years in succession*

TO win the National Air Tour, a ship must do five things better than any other ship . . . and do them consistently. And WACO did this in 1928 and again in 1929 . . . winning by a wide margin of points.

What are these five things that determine the victor in this event? They are the points of a formula that decides a ship's all-around performance . . . a formula agreed upon by the Contest Committee of the National Aeronautic Association as being fair and impartial to all entries.

Without becoming involved in the technicalities of the formula, these are the factors that go to make it up:

1. Useful Load—The *greater* the useful load a ship can carry, the higher its figure of merit becomes . . . for obvious reasons.

2. Speed—The *faster* a ship can travel with full load, the higher its figure of merit . . . because its practical utility is thereby improved.

3. Landing Time—The *shorter* the distance in which a ship comes to a dead stop, the higher its figure of merit . . . because its capability in emergency landings is greater.

4. Take-Off Time—The *quicker* a ship leaves the ground, the higher its figure of merit . . . because of its greater ability to get out of small fields.

5. Power—The *less* power a ship requires to make it thoroughly airworthy and practical, the higher its figure of merit . . . because its operation is more economical.

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✣ ✣ ✣

Here are the official figures for the winning WACO

With Department of Commerce type certificate load of 972 pounds . . . with average top speed of 135.4 m.p.h. clocked four times over a measured course . . . with the astonishing time of 3.4 seconds to dead stop in landing . . . with correspondingly abrupt take-off time of 4.4 seconds . . . and powered by the Wright J-6, 7-cylinder, 225 H. P. motor . . . WACO was awarded the highest figure of merit of all competing entries, regardless of size, type, or price.

THE WACO AIRCRAFT COMPANY, TROY, OHIO

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A SAFE PLANE *for* 10-*hour student flyers*

. . . and thrilling for those who've flown a thousand

HERE'S the SAFE light plane with Handley-Page wing slots . . . Here's the SAFE light plane with the low landing speed of 35 m. p. h. . . . Here's the SAFE light plane with an unfailing Cirrus 95 H. P. motor . . . Here's the SAFE light plane with the wide, split-axle undercarriage . . . Here's the SAFE light plane built to withstand 8 times the strain imposed in normal flight.

Pilots in 16 different countries fly the Avian for instruction, travel and sport. They herald it as the safest light plane in the world!

And no wonder!—for the Avian's design and equipment eliminate the every day hazards of flying.

First, the Avian zooms up fast . . . up—up—up . . . from the smallest of fields . . . right up over barns and trees and wires—into the blue.

It speeds unerringly for distant ports, with that tireless, air-cooled Cirrus motor humming out the miles by minutes.

It performs the dizziest of stunts with perfect control. If it is stalled, those Handley-Page wing slots stabilize the plane and guard against the spin.

It makes any fair-sized clearing its port. For it floats into an easy 3-point set-down at the unusually low landing speed of 35 m. p. h. Its wide and shock-absorbing undercarriage has no fear of even the roughest ground.

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When you fly or sell the Whittelsey Avian you have something to talk about. No other light plane has such a record of performance . . . or the equipment. Dealers and distributors are still being appointed. Write for further information concerning our sales plan. We will gladly send you the detailed story of the plane itself. The Whittelsey Mfg. Co., 225 Howard Avenue, Bridgeport, Conn.

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He got the Business

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A pilot himself, Mr. Morgan borrowed an airplane from a friend. Within 3½ hours he had visited the state land office, prepared claim papers and filed them in the proper county. First to file, his clients received the award—while Mr. Morgan, convinced of the dollars and cents value of a private plane, used his day's fee to purchase a new Ryan Brougham for himself.

Today, business men in ever-increasing number are finding Ryan airplanes valuable assets in the pursuit of their daily tasks—in getting there ahead of slow-traveling competition.

In business or pleasure Ryan airplanes—with their speed of 140 miles per hour and radius of 700 miles—*save valuable time.* Let us tell you more about Ryan transportation. Our illustrated catalog will be sent upon request.

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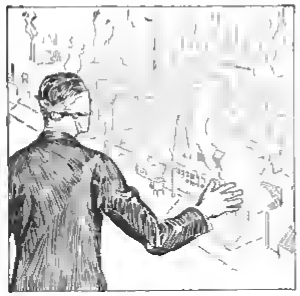
Builders of Lindbergh's "Spirit of St. Louis"

RYAN AIRCRAFT CORPORATION . . . . . Robertson, Missouri
Division of
DETROIT AIRCRAFT CORPORATION . . . . Union Trust Building, Detroit

"*Where* do we go from here?"



The spread and speed of American business have intensified the problem of plant expansion. Economic geography has become a new concern of industry.

"Where are our sources of raw materials? Is that the best place to go from a labor angle? Would we be too far from our markets? What are the power and transportation facilities? Will local legislation affect our costs? *Where* do we go from here?"

Every growing concern has wrestled with these problems. They have been compelled to contact many sources of information. They have had to scrape off the veneer of local enthusiasm to get at the real facts. Many have wondered why there was no clearing house for such data—no reliable source to turn to for confidential, unbiased help.

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"*WE USE* Goodrich Airplane Tires *Regularly*,"

says the

National Air Transport, Inc.,

Chicago, Ill.

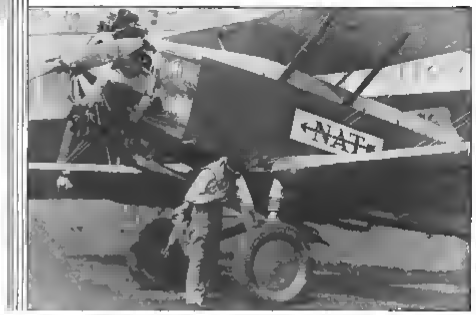
(ABOVE) *N. A. T. pilot, James D. Cleveland, member of the famed Caterpillar Club, has a record of nearly 200 000 miles in the air. His plane is equipped with Goodrich Tires.*

FLYING the mail looks easy. But the progress of a speeding plane, bearing a valuable cargo, is made possible only by the coordination of diversified units in a complex organization, each doing a definite job.

Goodrich Split-Second Silvertown Tires are built to withstand the strain of overloads, yet light enough to permit the handling of several extra pounds of "pay load." They are *designed* to reduce wind drag.

They are "*balloon*" enough to prevent sinking on yielding sands, *tough* enough for a thousand take-offs and landings on concrete runways, yet *streamlined* to reduce wind drag of landing gear to a minimum.

No mere claims need be made for Silvertowns. World records have *proved* them. And for "flying the mail" pilots say they are ideal.



(ABOVE) *Pilot Cleveland personally inspects his tires. Goodrich Silvertowns give him added assurance in flying the air mail*

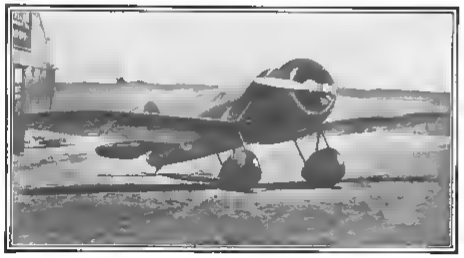
(LEFT) *"There's a quick change," says the mechanic to Pilot Cleveland "Goodrich Split-Second Silvertowns, of course We know where to get them."*

Goodrich

Rubber for Aviation

The B.F.Goodrich Rubber Company. Established 1870. Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ontario.

HASKELITE *used in* Travel Air "Mystery Ship"



THE record-breaking Travel Air "Mystery Ship," which won the free-for-all race at Cleveland Air Show over even Army and Navy entries, is HASKELITE-equipped—as in all Travel Airs delivered, now over eleven hundred in number.

This fact is in line with the past performance of this blood-albumin glued plywood . . . practically every record breaking and holding plane in this country has been equipped with it. And its superiority is further attested by the number of aircraft manufacturers regularly using it—over 85%. Write for engineering and other data on HASKELITE.

PLYWOOD HASKELITE PLYMETL

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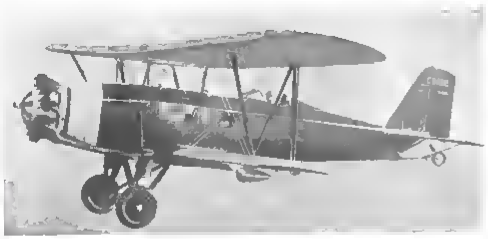

Stearman Light Transport carries Pyle-National Landing Lights

Regulations now require landing lights on all planes used for passenger service between sunset and sunrise. Experienced pilots want them on any plane likely to be used after dark

THE landing lights on the new Stearman give the pilot a clear, clean picture of the ground as he comes in for the landing after nightfall. Their brilliant illumination is the result of the exclusive Pyle-National design features, based upon more than 30 years' experience with lighting equipment for the severest classes of service.

Send for Pyle-National bulletins describing the landing lights. See why they give maximum effective lighting with minimum battery requirements, and negligible head resistance.

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2. Simplification of carburetors.
3. Moderate or appreciable increase of power at sea-level.
4. Appreciable increase of power at moderate altitudes.

G-E superchargers are standard equipment on practically all leading aviation engines.

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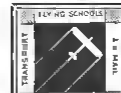

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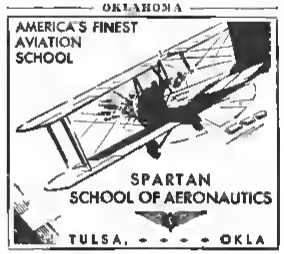

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AIRPLANE motors. Hispano Suiza A 150 hp, Hispano Suiza E 180 hp, Siemens-Halske and Curtiss OX-5 motors all in excellent condition. OX-5s at especially attractive prices. Write American Eagle Aircraft Corporation, Purchasing Agent, Fairfax Airport, Kansas City, Kansas.

AMERICAN Eagle 1928 120 hp motor, flown 200 hours, always kept in hangar, airspeed compass, 2 Scintilla magnetos, clock, bank indicator, dunlo special landing gear and many other extras. Will sacrifice for $1,500 cash. Ralph Daugler, 441 Willoughby Ave, Brooklyn, N Y.

AMERICAN Moth monoplane 2-place LeBlond 60 motor. Flying time 80 hours. Cash $1,400. Will take a used Kinner or Warner motor in on trade. Harry Kimmich, Ellwood City, Pa.

BIRD airplanes OX-5s $2,400 and $2,200. Also Waco 9 at $1,200 and Swallow $1,400. All in excellent condition. Hartung Aircraft Corporation, Box 27, Harper Station, Detroit, Mich.

BLUEPRINTS—German Glider training type recently imported, complete with specifications, a set postpaid. Turnbuckles 15c. Le Rhone 80 hp engine complete $55. Midway Aero Company, P O Box 283, St Paul, Minn.

BRAND new Arrow Sport LeBlond motor just as it was received from the factory in perfect condition, has never been flown. $2,400 for immediate sale. Hugh Borhwell, Freeport, Long Island. Telephone 4583.

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Plane	Motor Type	Price
Robins	OX-5	$2400
Robins	OX-5	2300
Robins	OX-5	3335
Robins	OX-5	3650
Commandaire	Warner	5400
Commandaire	OX-5	3165
Commandaire	OX-5	3340
Travel Air	OX-5	1300
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Fairchild	C-6	5000
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FOR SALE—Salmson 9 cylinder 230 hp radial engines Model Z-9, $250 each. These engines are completely dismantled and crated, originally as received. Most of them are new, although some have had approximately fifty hours. All in good shape, complete and serviceable. A very dependable engine and the only opportunity today to acquire an advanced type of engine at this price. Splendid for instruction or experimental purposes. Mrnesco Motors Inc., 6718 McKinley Ave, Los Angeles, Calif.

FOR SALE. Curtiss OXX-6 three-place biplane. First-class flying condition. Will sacrifice for immediate sale $500. P E Rollie, 145 W Fall Creek, Indianapolis, Ind.

FOR SALE. Four model A Hisso motors, complete in government crates from A I D, never been started. One new OX-5, three used OXX in good condition, complete set cowling radiator for 1928 American Eagle, good as new. Superior propeller, spinner type. Chas. H. Blasser, Belleville, Kansas.

FOR SALE—Government overhauled OX-5 motor with Miller valve action. $400 cash gets this bargain. Sky Roamers, Inc., Racine, Wis.

FOR SALE. Hisso Eaglerock, like new, motor perfect. Special paint job, compass, wing tanks, fuel pump. Paul Kienzle, Baird, Baltimore, Kansas City, Mo.

EXCEPTIONAL OPPORTUNITY

1—Curtiss Robin, OX5 Motor, 95 Hours	$2800.00
Licensed Ship in First Class Condition	
1—Good OX5 Motor	250.00
1—New OX5 Motor	400.00
2—H S L6 Liberty Motors	150.00
Various Tools, Instruments, Magnetos, etc.	25.00

F S-425 Aviation
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2—45 hp Anzani Motors $300 each
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FOR SALE

FOR immediate sale OX-5 Swallow training plane, brand new, flown from factory only, motor has new fabric will sell at once, price complete $1,800. Deliver any place for expenses. Paul Sauck, Plymouth, Ind.

FOR SALE—One four-cylinder 50 h p Roberts aviation motor $135, one 6-cylinder 70 h p Roberts aviation motor $80. P X Burger, 110d South Jefferson Ave., St Louis.

FOR SALE—One new Standard Steel propeller for Kinner or Warner motor. Price reasonable. FS-326 Aviation, Tenth Ave at 36th St., New York.

FOR SALE—OX-5 Travelair dual control D H wheels, complete, Miller overhead. $1,900. Charles Fritters, 2724 S Wayne Ave, Ft Wayne, Indiana.

FOR SALE—One complete set of wings for Driggs Dart II. Never been used. Extra upper right wing panel set of ailerons, good condition, will sell the lot for $125. Tred Avon Flying Service, Inc., Easton, Md.

FOR SALE. One 4-place cabin Travel Air monoplane with Wright Whirlwind J-5 motor with only 105 hours, new standard steel propeller, ship and motor in perfect condition ready to fly away. Best offer takes it. Also will take in good OX-5 biplane on trade. Wire me. H 1 King, Garnett, Kansas.

FOR SALE—Travelair OX-5 A-1 condition, fabric just overhauled. Licensed, quick sale $1,050. Edw. Fradler, 7819 Michigan Ave., St Louis, Mo.

FOR SALE—Waco 10 OX-5 licensed 200 hours, never cracked. Good condition, motor completely overhauled. Bargain at $1,550. Have bought Moth, reason for selling. Wellsville Aviation Club, Wellsville, N Y.

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Rhone 80 hp and 120 hp Engines
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FOR SALE—Eaglerock J-5 motormount and cowling, all complete, make offer. FS-310 Aviation, 10th Ave at 36th St., New York.

FOR SALE. OX-5 Combi Eaglerock, fully licensed and in perfect condition. Ship never cracked. Equipped with navigation and landing lights, dual controls, brakes, wheels, new tires, new propeller, wing walks on both sides. Motor just had complete overhaul. All new cylinders, pistons, bearings, etc. A sacrifice, $1,850. Cleveland Air Service Inc., 3830 W 162nd St., Cleveland, Ohio.

FOR SALE. Three-place Standard J-1 180 Hisso in good flying condition. Motor turns 1,500. Bargain for $825. Can arrange terms for part as will trade. What have you? Vern Canning, 383 11th St., Milwaukee, Wis.

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HISSO E Standard, new covering, ship and motor first-class, booster magneto, fuel pump, D H wheels, Dixie magnetos. Eight hundred cash. D M Andrew, 1362 East Washington St, Indianapolis, Ind.

NEW OXX-6 motors in original boxes, very reasonable price. Will ship with privilege of inspection. Grant Marine Motor Company, 2828 St Clair Ave, Detroit, Mich.

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TRAVELAIR J-5 $6,280, steel prop. $400 extra, instruments equipped cross country new this spring, motor 35 hours, cost $9,000. U S Aircraft Co, 78 Nilson St, New Brunswick, N J.

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HAVE patent pending, need $5,000 finance ship. Sound idea which will provide against engine failure one hundred per cent. Builder is ex-pilot and engineering officer, four army air services, holds all department license. BO-329 Aviation, Tenth Ave at 36th St., New York.

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REBUILD your OX5 with removable graphite guides, inserted seats and oversize valve action pins. OX5 and Hisso parts. Write for circular. Hochman Machine Works, 4052 West Lake Street, Chicago, Illinois.

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AV 1

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